مراجعة الإختبارات الأساسية والفرعية للمنهج طبقاً لنواتج التعلم تضع الإمتحان بين ايدك

أخبار التعليم
كمستري

الورقة الذهبية
مراجعة ليلة الامتحان

يوم واحد فقط يكفى للمراجعة

وصفة مختصرة للنجاح أعدها خبراء وزارة التربية والتعليم فى وضع الامتحان

200 فكرة سؤال بنظام البابل شيت طبقاً لمواصفات وزارة التربية والتعليم

الوحدة الاولي

1- An element from the first transition series, one of its compounds is used in dyes.
- Which of the following choices represents the electronic structure of this element's ion in this compound?

(a) $[_{18}Ar]\ 4s^1\ 3d^5$
(b) $[_{18}Ar]\ 3d^3$
(c) $[_{18}Ar]\ 4s^2\ 3d^3$
(d) $[_{18}Ar]\ 3d^2$

2- Which of the following expresses the electronic distribution of a non-transition element ion?

(a) X^{3+}: $[Ne]3s^2,3p^6$
(b) Y^{2+}: $[Ar]\ 3d^6$
(c) Z^{2+}: $[Ne]\ 3s^2,\ 3p^6$
(d) W^{3+}: $[Kr]\ 4d^7$

3- Four test tubes X, Y, Z, and W, each contain a salt solution as shown in the following table:

W	Z	Y	X
$V(NO_3)_5$	$Ti(NO_3)_3$	$Fe(NO_3)_3$	$Mn(NO_3)_2$

- Which of these tubes should be covered in order to not be change the composition of the solution inside it?

(a) X (b) Y (C) Z (d) W

4- Two consecutive transition elements (X) and (Y), from the first transition series contain the same number of electrons in the (3d) subshell.
-Which of the following is true?

(a) The effective nuclear charge of element (X) is greater than the effective nuclear Charge of element (Y)
(b) The radius of element (X) is smaller than the radius of element (Y)
(c) The radius of element (X) is equal to the radius of element (Y)
(d) The repulsion between the (3d) electrons of element (X) is less than the repulsion Between the (3d) electrons of element (Y)

5- Which of the following describes the change that occurs to siderite ore when Heated in air?

(a) Its mass increases and percentage of iron increases in it.
(b Its mass decreases and percentage of iron increases in it.
(c) Its mass decreases and percentage of iron decreases in it.
(d) Its mass increases and percentage of iron decreases in it.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

6- Two consecutive elements (X, Y) from the first transition series, element (X) has the highest oxidation state in the series. Which of the following is correct?

(a) Element (Y) is diamagnetic and its atom contains 6 unpaired electrons

(b) Element (X) is diamagnetic and its atom contains 6 unpaired electrons.

(c) The Y^{2+} ion is paramagnetic and contains 4 unpaired electrons.

(d) The X^{3+} ion is paramagnetic and contains 5 unpaired electrons.

7- Which of the following represents the correct order of ions of some elements according to their magnetic attraction?

a) $Fe^{2+} > Ti^{4+} > Mn^{2+}$

b) $Mn^{2+} > Fe^{2+} > Ti^{4+}$

c) $Mn^{2+} > Ti^{4+} > Fe^{2+}$

d) $Ti^{4+} > Mn^{2+} > Fe^{2+}$

8- Which of the following represents the product of the chemical processes to dress iron ore before reduction?

a) A decrease in the mass of the ore and a decrease in iron percentage.

b) A decrease in the mass of the ore and increase volume of ore.

c) A decrease in the percentage of impurities and a decrease in the percentage of iron.

d) A decrease in the percentage of impurities and an increase in the percentage of iron.

9- Which of the following expresses the reaction for preparing the reducing agent for iron ore in one of the furnaces?

a) Water vapor with coke

b) Hydrogen gas with coke

c) Carbon dioxide with methane

d) Water vapor and carbon dioxide with methane

10- Which of the following represents the correct order of the processes required to obtain black oxide of iron from $FeCl_3$?

a) Addition of alkaline solution - thermal decomposition - reduction

b) Thermal decomposition - oxidation - addition of alkaline solution

c) Addition of alkaline solution - reduction - thermal decomposition

d) Thermal decomposition - reduction - addition of alkaline solution

11- Which of the following represents the correct order of the processes performed on limonite ore to obtain steel?

a) Roasting - addition of carbon - reduction

b) Reduction - addition of manganese - roasting

c) Roasting - reduction - addition of carbon

d) Purification of the ore - sintering - reduction

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

12- All of the following are intermetallic alloys except:

a) Cementite b) Brass c) Duralumin d) Lead and gold

13- Coke plays a role in extracting zinc from its ores according to the following equation: $2ZnO + C \rightarrow 2Zn + CO$

- Which of the following materials plays the same role as coke in extracting iron?

a) A mixture of ($CO + H_2$)

b) Methane gas

c) Coke

d) A mixture of ($CO_2 + H_2O$)

14- Which of the following expresses the electronic structure of a transition metal ion and the use of one of the compounds of this ion?

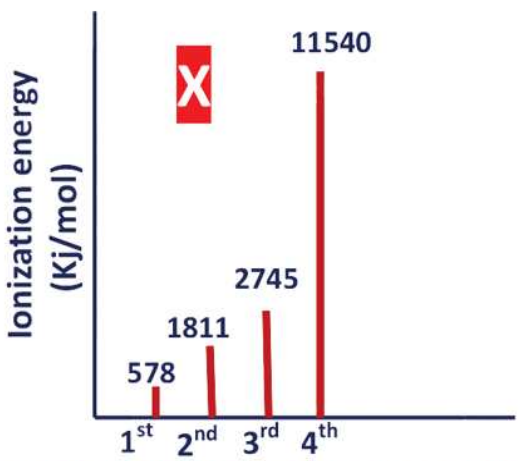
(a) $[_{18}Ar]\ 3d^3$ - Used in dry car batteries

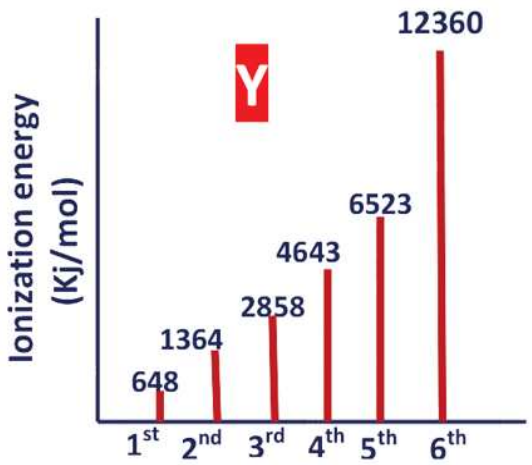
(b) $[_{18}Ar]$ - Used as a catalyst in the contact method

(c) $[_{18}Ar]$ – in artificial joints

(d) $[_{18}Ar]\ 3d^6$ – oil hydrogenation

15- The following graphs represent the ionization energies of two elements (X) and (Y):





-Which of the following expresses the type of element (X) and (Y) and the use of One of their alloys?

	Type of element	Use of one of its alloys
A	(X) Transition	Used in aircraft structures
B	(X) Non-transition	Used in Mig fighter jets
C	(Y) Transition	Used in railway tracks
d	(Y) Non-transition	used in drink cans

16- A transition element (X) from the first transition series has similar properties of the element that precedes and follows it in the same group.

-Which of the following easily occurs for its ions?

(a) $X^{3+} \rightarrow X^{2+}$ (b) $X^{4+} \rightarrow X^{3+}$

(c) $X^{3+} \rightarrow X^{4+}$ (d) $X^{2+} \rightarrow X^{3+}$

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

17- Which of the following is necessary to prepare iron (III) sulphate from iron (II) sulphate?

(a) Thermal decomposition followed by the addition of dilute sulphuric acid
(b) Thermal decomposition followed by the addition of concentrated sulphuric acid
(c) Addition of sodium hydroxide followed by the addition of dilute sulphuric acid
(d) Oxidation followed by the addition of sodium hydroxide

18- Study the following table:

	Properties of the ore before dressing	Properties of the ore after dressing
Mass of ore	4 Kg	3.85Kg
% of iron	45%	69%

- What process was used to dress the ore?

(a) Crushing
(b) Roasting
(c) Sintering
(d) Reduction

19- Two consecutive transition elements (X) and (Y) from the first transition series contain the same number of electrons in (3d) subshell,element (X) is resisting effect of air.

- Which of the following describes the properties of elements (X) and (Y)?

(a) Element (Y) has a lower density than element (X)
(b) The atomic mass of element (X) is greater than that of element (Y)
(c) The radius of element (X) is greater than the radius of element (Y)
(d) The effective nuclear charge of element (Y) is greater than that of element (X)

20- The representative element (X) is forming the following alloys:

-Intermetallic alloy with element (Y)
- An alloy used in the manufacture of Mig aircraft with element (Z)
- An alloy used in the manufacture of spacecraft with element (L)
Which of the following expresses elements X, Y, Z and L?

	(X)	(Y)	(Z)	(L)
A	Al	Ni	Sc	Ti
B	C	Fe	Ni	Cr
C	Pb	Au	Ni	Ti
d	**Al**	**Ni**	**Fe**	**Sc**

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

21- All of the following are characteristics of transition elements that lead to the formation of substitution alloys, except:

(a) Similarity in their atomic radii

(b) Similarity in their chemical properties

(c) They have the same crystal lattice structure

(d) They react easily with each other

22- Two transition elements (X) and (Y) from the first transition series.

(X): One of its oxides is used as a catalyst in the manufacture of superconducting Magnets.

(Y): Its atom contains unpaired electrons twice that found in element (X).

- Which of the following is correct?

(a) The atomic radius of element (Y) is less than that of the element follow it in The series.

(b) The effective nuclear charge of element (Y) is less than that of element (X).

(c) The maximum oxidation state of element (Y) is higher than that of element (X).

(d) The density of element (Y) is less than that of the preceding element in the series.

23- Element (X) from the first transition series contains completely filled (d) sublevel.

-Which of the following expresses the type of element (X) and electronic distribution of this element's ion in the compound X_2O?

(a) Transition, [Ar] $3d^{10}$

(b) Transition, [Ar] $3d^{9}$

(c) Non-transition, [Ar] $3d^{10}$

(d) Non-transition, [Ar] $3d^{9}$

24- All of the following occur to iron ore during roasting process except:

(a) Some gases and vapors are produced from the ore.

(b) All iron ores oxidizes.

(c) The color of limonite and siderite changes.

(d) Most of the impurities in the ore oxidize.

25- Which transition metal ions in the following compounds is the easiest to Reduce?

(a) $Mn(NO_3)_3$ (b) $Fe(NO_3)_3$

(c) $Ti(NO_3)_4$ (d) $V(NO_3)_5$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

26- What is the correct sequence of processes and furnaces that hematite ore goes through to obtain iron steel?

(a) Roasting – Midrex furnace – Blast furnace
(b) Roasting – Midrex furnace – Oxygen converter
(c) Electric furnace – Midrex furnace – Open hearth furnace
(d) Open hearth furnace – Blast furnace – Oxygen converter

27- Element X, from the first transition series, is used in an acid-resistant alloy. Which Of the following represents the electronic configuration of the X^{3+} ion?

a) $[_{18}Ar]\ 3d^3$
b) $[_{18}Ar]\ 3d^6$
c) $[_{18}Ar]\ 3d^7$
d) $[_{18}Ar]\ 3d^4$

28- Element X, from the first transition series, has a completely filled (d) sublevel and no unpaired electrons in any oxidation state. Which of the following represents the element type and the electronic configuration of its ion in the compound XO?

a) Transition, $[Ar]\ 3d^{10}$
b) Transition, $[Ar]\ 3d^9$
c) Non-transition, $[Ar]\ 3d^{10}$
d) Non-transition, $[Ar]\ 3d^9$

29- Which of the following expresses one of the reasons for using nickel as a catalyst in Oil hydrogenation?

a) Increases the surface area of the reactants
b) Decreases the chance of collisions between the reactant molecules.
c) Electrons of 4s, 3d share in concentrating reactants on its surface.
d) Increases the activation energy of the reactant molecules.

30- Two non-consecutive transition elements, X and Y, are from the first transition series

Element X: One of its compounds is used as a catalyst in the contact method.
Element Y: It has the same number of unpaired electrons as element X.
- Which of the following is correct?

(a) The radius of element (X) is larger than that preceding it in the series
(b) The effective nuclear charge of element (Y) is less than that of element (X)
(c) The density of element (Y) is less than the density of element X
(d) The atomic mass of element (Y) is greater than that follow it in the series.

31- (A, B, and C) three consecutive elements from the first transition series. Element (A) has an anomalous electronic configuration than that of other elements in the series.
-Which of the following represents the correct order of magnetic moments for ions of these elements in the oxidation state (3+)?

a) $A^{3+} > B^{3+} > C^{3+}$
b) $B^{3+} > C^{3+} > A^{3+}$
c) $B^{3+} > A^{3+} > C^{3+}$
d) $C^{3+} > B^{3+} > A^{3+}$

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

32- Fe_2O_3 can be obtained by all of the following methods except:

a) Addition of (dil.) H_2SO_4 to the product of reduction Fe_3O_4/ Addition of alkali / Heating above 200°C

b) Passing hot air on red hot iron / Oxidation

c) Leaving iron (II) sulphate in air for a period of time / Addition of alkali / Heating above 200°C

d) Addition of iron to diluted oxalic acid / Heating in the absence of air / Oxidation

33- Which of the following processes is necessary to produce steel iron from a sample of siderite?

a) Roasting - Oxidation - Removing impurities - Addition of carbon.

b) Roasting - Reduction - Removing impurities - Addition of carbon.

c) Removing impurities - Roasting - Addition of carbon - Reduction.

d) Removing impurities - Reduction - Addition of carbon - Roasting.

34- Two elements (A, B) from the first transition series, each (A^{+2}, B^{+2}) containing four Single electrons and element (A) is less dense than element (B).

- Which of the following expresses a use for each of (A, B)?

a) (A): in manufacture of soft drink bottles
(B): in reinforced concrete.

b) (A): in plating of metals to protect it from rust
(B): in manufacture of heating coil

c) (A) : in leather tanning and
(B) : in manufacture of surgical tools

d) (A) : in dyes
(B) : catalyst in manufacture of ammonia

35- If you know that the elements (X, Y, Z, and W) are transition elements from the first Transition series.

W: has the highest magnetic moment in the series

Z : its sublevel (d) is filled with electrons.

X : Pairing doubling of electrons in the sublevel (3d) starts after it.

Y: is the first element in the series that does not lose all electrons (4S,3d).

- Which of the following conversions gives a compound with lower energy?

(a) $WO_3 \rightarrow WO$ (b) $ZO \rightarrow Z_2O_3$

(c) $Y_2O_3 \rightarrow YO$ (d) $X_2O_3 \rightarrow XO$

36- Three transition elements (A, B, and C)

-The number of unpaired electrons in (A) decreases when it changes from Atomic state to +2 ion.

-The number of single electrons in element (B) increases when it changes from +2 to +3

- The number of single electrons in element (C) decreases when it changes from +2 to +3 And its radius is equal to that of (A)

Which of the following expresses the correct order of these elements according to their density?

a) A < B < C b) A < C < B C) B < C < A d) B < A < C

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

37-A,B,C and D) Four consecutive transition elements from the first transition series, the electronic distribution of ion (B^{3+}) ends with $3d^3$,Which of the following is correct?

a) The magnetic moment of (A) increases with the loss of two electrons.

b) The magnetic moment of (B) increases with the loss of two electrons.

C) The magnetic moment of (C) decreases with loss the first electron from the (d) sublevel

d) The magnetic moment of (D) decreases with the loss of the first electron from the (d) level.

38-Which of the following processes causes an increase in the magnetic moment of iron ions in their compounds?

(a) Heating the compound resulting from adding ammonium hydroxide to iron III chloride above 200°C

(b) Heating the compound resulting from adding iron filings to dilute sulphuric acid.

(c) Heating limonite ore strongly in air.

(d) Heating siderite ore in absence of air.

39- (Y, X) are two consecutive transition elements in the first transition series, each of them has a compound in its highest oxidation state act as an oxidizing agent.

- Which of the following is correct?

a) (X) is used as a catalyst in the ammonia industry.

b) (Y) is used in car springs

C) The alloy consisting of element (Y) and the element following it with non-metals is Characterized by acid resistance.

d) The alloy consisting of the two elements between which (X and Y) are located With carbon is characterized by hardness.

40-Three consecutive elements (A, B and C) from the first transition series. Element (C) has twice the number of unpaired electrons as element (B) and three times the number of unpaired electrons as element (A).

- Which of the following represents the uses of elements (A, B and C)?

Choices	A	B	C
a)	Dry cell	metal plating	Fehling's solution composition
b)	Hydrogenation of oils	heating coils	luminescent paints
c)	Oxidizing agent and disinfecting	galvanization	magnet manufacturing
d)	artificial joints	car spring manufacturing	metal plating

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

41-Element (X) is an element of the second transition series, and its electronic configuration ends with $nS^{(n-3)}$, $(n-1)d^{2n}$

-Which of the following represents the type of element (X) and its use?

(a) Transition element used in coinage metals

(b) Transition element used with a non-transition element in the manufacture of Rechargeable batteries

(c) Non-transition element used with a transition element in the manufacture of Rechargeable batteries

(d) Non-transition element whose oxide is used in the manufacture of rubber and paints

42-A main transition element (X), whose (d) sublevel contains two unpaired Electrons in its oxidation state (3+).

-Which of the following oxidation states produced from break down a completely Filled principal energy Level with electrons

a) X^{7+} b) X^{6+} c) X^{5+} d) X^{4+}

16-(X, Y) represent processes that take place during an iron ore dressing:

(X) : reduces the size of iron ore particles while its mass remains constant.

(Y) : increases the number of unpaired electrons in the iron ion.

Which of the following represents processes (X, Y)?

	X	Y
a)	crushing	Siderite roasting
b)	sintering	Surface tension
c)	crushing	Hematite roasting
d)	sintering	Magnetic separation

43- Element (X) from the first transition series, its X^{2+} ion contains (11) filled orbitals and (3) half-filled orbitals.

-Which of the following does not describe element (X)?

a) Its atomic mass is less than the element that follows it

b) Its density is less than the element that follows it

c) All its compounds are paramagnetic

d) Its effective nuclear charge is greater than the element that precedes it

44- The following diagram illustrates some reactions of iron and its compounds:

$$(A) \xrightarrow{Cl_2} (B) \xrightarrow{NaOH\ (aq)} \text{Reddish brown ppt.} \xrightarrow{\Delta} (C) \xrightarrow{CO/280^{\circ}C} (D)$$

- From the previous diagram, which of the following is correct?

a) Replacing chlorine with dilute hydrochloric acid gives the same product as (B).

b) Both (A) and (D) react with concentrated sulfuric acid to give a mixture of iron (II) and iron (III) sulphate.

c) Compounds (B) and (C) have the same magnetic moment and (C) can be reduced to (A) by hydrogen at 500°C.

d) Compound (C) reacts with dilute hydrochloric acid to give compound (B).

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

45- Each of the following represents a group of transition and non-transition elements That form different types of alloys.

(X): non-transition element from the third period, Group IIIA

(Y): non-transition element from the second period, Group IVA

(A): transition element used as a catalyst in the hydrogenation of oils

(B): transition element used as a catalyst in the Fischer-Tropsh process

- Which of the following represents the type of alloy formed from some of the Above elements?

	An alloy of (Y) and (B) whose components can be separated by dilute acid	An alloy of (Y) and (B) whose components cannot be separated by dilute acid	An alloy of (X & A)	an alloy of (Y, A & B)
a)	intermetallic	Interstitial	Substitutional	Interstitial & intermetallic
b)	Interstitial	Substitutional	intermetallic	Substitutional & Interstitial
c)	Interstitial	intermetallic	intermetallic	Substitutional & Interstitial
d)	Substitutional	intermetallic	Interstitial	Substitutional & Interstitial

46- (X, Y and Z) are three transition elements used in the medical field.

(X): One of its alloys is used in surgical instruments.

(Y): It is used in artificial joints.

(Z): One of its isotopes is used in the diagnosis and treatment of malignant tumors.

- Which of the following represents the elements (X, Y and Z)?

	(X)	(Y)	(Z)
a)	Chromium	Cobalt	Cadmium
b)	Iron	Titanium	Cobalt
c)	Cobalt	Vanadium	Chromium
d)	Iron	Titanium	Vanadium

47- The following table shows the electronic configuration of the cations of two elements, (X) and(Y)

The cation	The electron configuration
X^{2+}	$_{18}Ar, 3d^4$
Y^{2+}	$_{18}Ar, 3d^2$

-Which of the following is correct?

a) It is difficult to oxidize X^{6+} to X^{7+}

b) It is difficult to oxidize Y^{2+} to Y^{4+}

c) It is easy to reduce X^{6+} to X^{2+}

d) It is easy to reduce Y^{4+} to Y^{3+}

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

48- (X, Y, Z) three transition elements at the end of the first transition series. Arranged according to atomic mass (Y < Z < X)

-Which of the following represents the correct order of ions of these elements according to the magnetic moment?

a) $Z^{2+} > Y^{2+} > X^{2+}$

b) $X^{2+} > Y^{2+} > Z^{2+}$

c) $Z^{2+} > X^{2+} > Y^{2+}$

d) $X^{2+} > Z^{2+} > Y^{2+}$

49- Which of the following represent the correct order of processes required obtaining a stainless steel alloy from the products of reduction furnace cleaning?

(a) Concentration – Roasting – Reduction –melting with chromium.

(B) Concentration – reduction – roasting –melting with manganese

(C) Sintering – roasting – addition of carbon and chromium – reduction.

(D) Sintering – roasting – reduction – addition of carbon and chromium

50- A transition element (X) with the lowest oxidation state in the first transition series, when chemically combined with another metal to form an alloy.

-Which of the following is true regarding the type of alloy and the use of element X?

a) Substitutional alloy, and (X) is used in the manufacture of soft drink cans.

b) Substitutional alloy, and (X) is used in the manufacture of railway tracks.

c) Intermetallic alloy, and (X) is used in the manufacture of MiG fighter jets.

d) Intermetallic alloy, and (X) is used in the manufacture of coins.

51- (A, B) are iron (II) salts and the thermal decomposition of each in absence Of air give an iron oxide, as shown by the following equations:

$$A_{(s)} \xrightarrow{\Delta} C_{(s)} + D_{(g)} + E_{(g)}$$

$$B_{(s)} \xrightarrow{\Delta} G_{(s)} + L_{(g)} + M_{(g)}$$

The gas (D) is a reducing agent during extraction of iron

-Which of the following represents A, B, C, and G?

	A	B	C	G
a)	$(COO)_2Fe$	$FeSO_4$	FeO	Fe_2O_3
b)	$Fe(OH)_3$	$FeCO_3$	Fe_2O_3	FeO
c)	$(COO)_2Fe$	$FeSO_4$	Fe_2O_3	FeO
d)	$FeCO_3$	$Fe(OH)_3$	FeO	Fe_2O_3

52- The following diagram represents the reactions of iron compounds:

Yellow iron ore $\xrightarrow{\text{Heating}}$ $X_{(s)}$ $\xrightarrow[800^{\circ}C]{H_2}$ $Y_{(s)}$ $\xrightarrow[\text{In air}]{\text{Strong heating}}$ $Z_{(s)}$

- Which of the following represents the chemical formulas of (X, Y and Z)?

	X	Y	Z
a)	Fe_2O_3	Fe	Fe_3O_4
b)	Fe_3O_4	FeO	Fe_2O_3
c)	Fe_2O_3	FeO	Fe_3O_4
d)	FeO	Fe	Fe_2O_3

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

53- **(X, Y) are two elements from the first transition series. The number of unpaired electrons is equal in both (X^{3+}) and (Y^{3+}), while the number of unpaired electrons in the (X^{4+}) ion is greater than that in the (Y^{4+}) ion.**

Which of the following are the uses of these two elements?

(a) Element X: Manufacturing modern dry cell batteries
Element Y: Manufacturing railway tracks.

(b) Element X: Manufacturing railway tracks.
Element Y: Manufacturing modern dry cell batteries.

(c) Element X: Hydrogenation of oils.
Element Y: Manufacturing MiG fighter jets.

(d) Element X: Metal coating.
Element Y: Hydrogenation of oils and heating coils.

54- **(X, Y) are two elements from the first transition series that having the same number of unpaired electrons. The number of unpaired electrons of element (X) decreases when converting from the (2+) state to the (3+) state.**

Which of the following choices is correct?

(a) The density of element (X) is greater than that of element (Y).

(b) The atomic radius of element(Y) is greater than that of element (X).

(c) The atomic mass of element (Y) is greater than that of element (X).

(d) The atomic number of element (X) is greater than that of element(Y).

55- **- Which of the following describes the alloy that is used in the manufacture of car springs?**

(a) Carbon atoms occupy the spaces between the crystal lattice, and some iron atoms are replaced by manganese atoms.

(b) Carbon atoms occupy the spaces between the crystal lattice, and some iron atoms are replaced by vanadium atoms.

(c) Vanadium atoms occupy the spaces between the crystal lattice, and some iron atoms are replaced by carbon atoms.

(d) Vanadium atoms occupy the spaces between the crystal lattice, and some iron atoms react with carbon atoms.

56- **Which of the following compounds, in their solutions, can easily reduce the Manganese ion (Mn^{7+}) to (Mn^{2+})?**

a) $ScCl_3$

b) $Ti(NO_3)_4$

c) $FeSO_4$

d) $ZnCl_2$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

57- The following table shows the electronic configuration of the cations of some elements in the first transition series.

The cation	Electronic Configuration
X^{2+}	$_{18}Ar, 3d^6$
Y^{4+}	$_{18}Ar, 3d^6$

Which of the following options represents the elements (Y, X)?

	X	Y
a)	Used in reinforced concrete	has 5 stable isotopes
b)	Used in cooking utensils	has 12 radioactive isotopes
c)	Diamagnetic	Paramagnetic
d)	Largest in density	used in the treatment of tumors

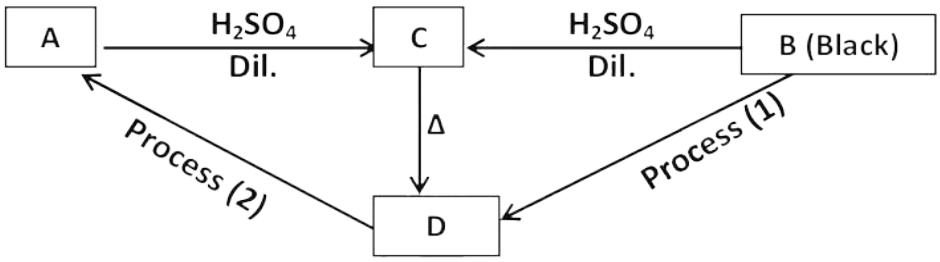
58- Three consecutive elements in the first transition series are (X), (Y), and (Z).
Element (X): All its compounds are paramagnetic.
Element (Y): Some of its compounds are paramagnetic, and some are diamagnetic.
Element (Z): All its compounds are diamagnetic.
- Which of the following represents groups of elements (X, Y and Z) in the periodic table?

	(X)	(Y)	(Z)
a)	IB	IIB	IIIB
b)	8	IB	IIB
c)	IIIB	IVB	VB
d)	VB	VIB	VIIB

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

Essay questions:

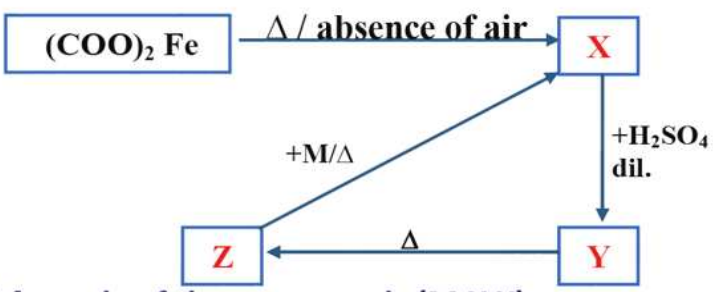
1-The following diagram represents some of iron and its compounds reactions:



(a) Mention the names name each of the processes (1) and (2)
(b) Write the chemical formula for each of (C) and (D)

.....
.....
.....
.....
.....
.....
.....
.....

2- Study the following diagram and answer:

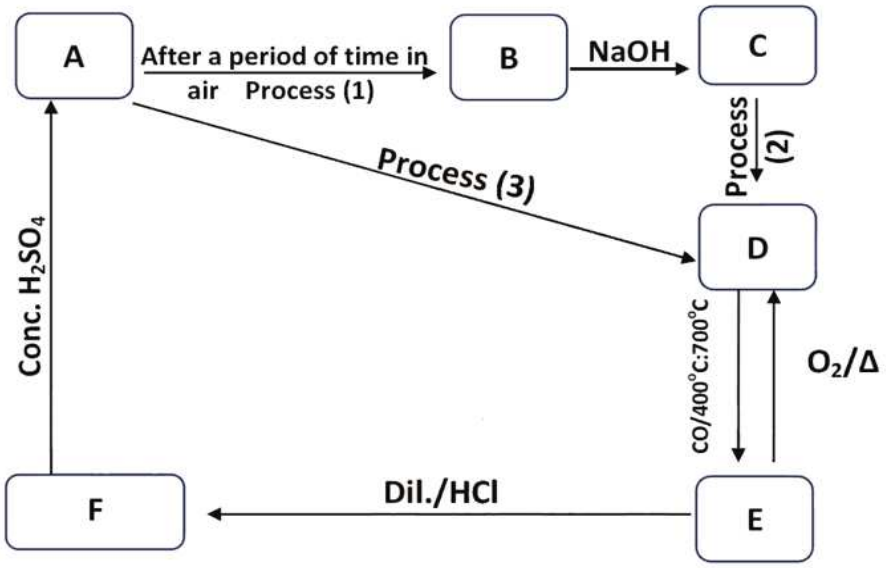


1-Write chemical formula of the compounds (M,X,Y)
2-write the chemical formula of the compound with the highest magnetic Moment in the above diagram.

.....
.....
.....
.....
.....
.....
.....
.....

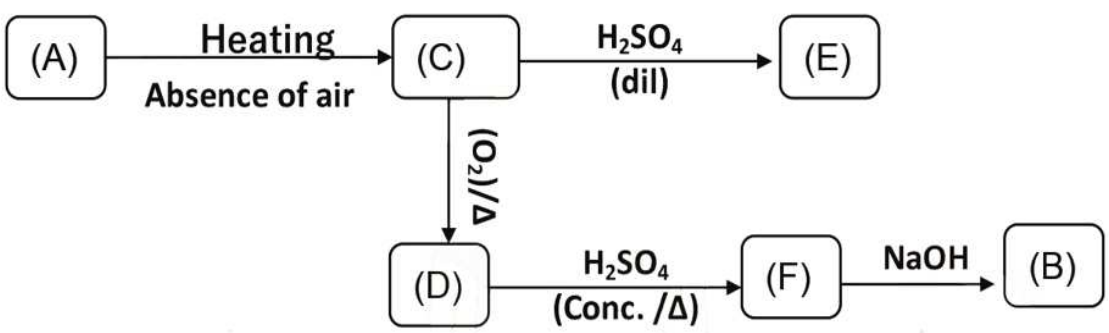
موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

3- From the following diagram: -



(1) Write the chemical formulas for (F, B).
(2) What is the number of the process that represents thermal decomposition and Don't accompanied with change in magnetic moment of iron?
(3) What is the name of the process number (3)?

4- The following diagram illustrates some reactions involving iron compounds:



-Answer the following questions:
(1) From the diagram above, write the chemical names of the compounds that, when Strongly heated, yield substance (D).
(2) What is the name of the iron compound produced by the reaction of (D) with Concentrated hydrochloric acid?
(3) Write the chemical formula for compound (F).

.....
.....
.....
.....
.....

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

الوحدة الثانية

1- Which of the following expresses the effect of the gas produced by (the reaction of dilute hydrochloric acid with sodium sulphite)?

(a) It turns a paper wet with potassium dichromate solution to green.

(b) It does not remove the color of acidified potassium permanganate solution.

(c) It turns a paper wet with lead acetate solution to black.

(d) It turns a paper wet with starch to yellow.

2- Which of the following reactions produces a precipitate?

(a) Hydrogen sulphide gas with lead (II) acetate solution

(b) Sodium thiosulphate solution with brown iodine solution

(c) Sulphur dioxide gas with acidified potassium dichromate solution

(d) Sodium nitrite solution with acidified potassium permanganate solution

3- When hot concentrated sulphuric acid reacts with salt (X), a gas that difficult to be oxidized by acid is released, and when the same acid reacts with salt (Y), a gas that is partially oxidized is released. Salts (X) and (Y) are:

	X	Y
A	Sodium chloride	Sodium iodide
B	Sodium bromide	Sodium iodide
C	Sodium nitrate	Sodium carbonate
d	Sodium chloride	Sodium sulphate

4- When barium chloride solution is added to salt solution (X), a white precipitate forms that dissolves in dilute acids, and when lead II acetate solution is added to salt solution (Y), a white precipitate forms.

- Which of the following expresses the anions of salts (X) and (Y)?

	Anion of salt (X)	Anion of salt (Y)
A	Phosphate	Sulphate
B	Phosphate	Sulphide
C	Sulphate	Phosphate
d	Chloride	Sulphate

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

5-From the following diagram:

White ppt. ← Diluted sulphuric acid — X^{2+} — Sodium carbonate solution → White ppt.

-Which of the following represents cation (X^{2+}):-

(a) Ca^{2+}
(b) Cu^{2+}
(C) Mg^{2+}
(d) Fe^{2+}

6-Which of the following solutions can be added to a solution containing cations (Al^{3+}, Fe^{2+}, Ca^{2+}) to precipitate only one of these cations?

(a) Sodium carbonate
(b) An abundance of sodium hydroxide
(c) An abundance of ammonium hydroxide
(d) Potassium chloride

7- When adding 200 mL of 0.2 M sulphuric acid to 300 mL of 0.2M calcium hydroxide according to the following equation:

$$H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + 2H_2O$$

- Which of the following expresses the concentration of the remaining substance without reaction?

(a) 0.080 M
(b) 0.040 M
(C) 0.066 M
(d) 0.0100 M

8-Which of the following pairs of salts can be distinguished by using hydrochloric acid?

a) Na_3PO_4, Na_2SO_3
b) NaBr, NaCl
c) $NaNO_3$, NaI
d) Na_2CO_3, $NaHCO_3$

9- Which of the following cannot be used to distinguish between a calcium carbonate precipitate and a silver phosphate precipitate?

a) The difference in the color of each precipitate
b) Addition of water with dissolved carbon dioxide
c) Addition of ammonium hydroxide solution (NH_4OH)
d) Addition of acidified $KMnO_4$ solution to each of them

10- A mixture of hydrogen sulphide and sulphur dioxide gases is released from a factory.

-Which of the following solutions can be used, to get rid of these gases separately?

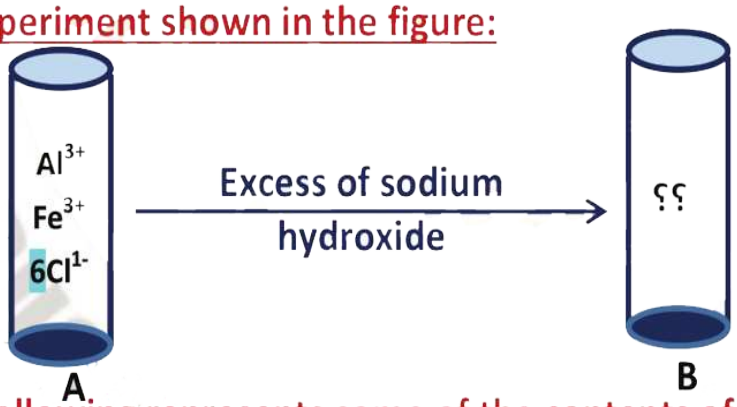
a) Sodium chloride solution followed by lead (II) acetate
b) Hydrochloric acid followed by acidified potassium permanganate
c) Lead (II) nitrate solution followed by copper sulphate solution
d) Lead (II) acetate solution followed by acidified potassium

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

11- Salt solution (X) reacted with both:
Silver nitrate solution, forming a white precipitate
Ammonium carbonate solution, forming a white precipitate
-Which of the following represents salt (X)?

a) Calcium chloride
b) Calcium phosphate
c) Sodium chloride
d) Lead (II) nitrate

12- From the experiment shown in the figure:



- Which of the following represents some of the contents of test tube (B)?

a) $Al^{3+}_{(aq)}$, $Na^{+}_{(aq)}$, $AlO_2^{-}{}_{(aq)}$, $Cl^{-}_{(aq)}$
b) $Al(OH)_{3(s)}$, $Fe^{3+}_{(aq)}$, $AlO_2^{-}{}_{(aq)}$, $Cl^{-}_{(aq)}$
c) $Fe(OH)_{3(s)}$, $Fe^{3+}_{(aq)}$, $Al^{3+}_{(aq)}$, $AlO_2^{-}{}_{(aq)}$
d) $Fe(OH)_{3(s)}$, $Na^{+}_{(aq)}$, $AlO_2^{-}{}_{(aq)}$, $Cl^{-}_{(aq)}$

13- 44.8 g of potassium hydroxide was dissolved in water to make 500 mL of solution. 10 mL of this solution was titrated using 0.2 M sulphuric acid. Which of the following represents the volume of the consumed acid? [K=39, H=1, O=16]

a) 8 mL
b) 40 mL
c) 180 mL
d) 160 mL

36- 1.437 g of $ZnSO_4.XH_2O$ was dissolved in water, and then barium chloride solution was added, 1.165 g of barium sulphate precipitated.
-Which of the following represents the molecular formula of hydrated zinc sulphate?
[Zn=65.4, Ba=137.3, S=32, O=16]

a) $ZnSO_4.5H_2O$
b) $ZnSO_4.6H_2O$
c) $ZnSO_4.7H_2O$
d) $ZnSO_4.8H_2O$

14- In the following spontaneous reaction: $Ni_{(s)} + CuCl_{2\,(aq)} \rightarrow Cu_{(s)} + NiCl_{2\,(aq)}$
-Which of the following is correct?

14-
a) Copper ion is a strong reducing agent.
b) Solutions of copper salts can be stored in nickel containers.
c) Solutions of nickel salts can be stored in a copper container.
d) Chloride ion is a strong oxidizing agent.

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

15- Hydrochloric acid solution was added to three solid salts (X, Y, Z) separately, and the results were as follows:

(X): A gas rises that does not change the color of the acidified potassium Permanganate solution.

(Y): A suspension forms in the solution and a gas affects the acidified potassium Permanganate solution.

(Z): The color of the solution does not change and no gas is evolved.

- Which of the following is true for salts (X, Y, Z)?

	Salt X	Salt Y	Salt Z
A	Silver bicarbonate	Sodium thiosulphate	Sodium nitrate
B	Sodium sulphite	Sodium nitrate	Sodium nitrite
C	Sodium carbonate	Sodium thiosulphate	Sodium sulphide
d	Sodium nitrate	Sodium nitrite	Sodium chloride

16- The following experiments were conducted on four salt solutions X, Y, Z, and W:

Solution X: A precipitate formed when calcium hydroxide solution was added.

Solution Y: No precipitate formed when calcium hydroxide solution was added.

Solution Z: Decolorizes color of the iodine solution.

Solution W: A black precipitate formed when lead nitrate II was added.

Which of the following is correct for salts (X, Y, Z , W)?

	Salt (X)	Salt (Y)	Salt (Z)	Salt (W)
A	Potassium bicarbonate	Ammonium carbonate	Sodium sulphide	Sodium thiosulphate
B	Ammonium carbonate	Potassium bicarbonate	Sodium thiosulphate	Sodium sulphide
C	Sodium thiosulphate	Sodium sulphide	Ammonium bicarbonate	Sodium sulphide
d	Sodium sulphide	Sodium thiosulphate	Ammonium carbonate	Sodium bicarbonate

17- Which of the following is not used to distinguish between nitric oxide gas and hydrogen chloride gas?

(a) Sodium chloride solution

(b) Exposing each separately to air

(c) Glass rod wet ammonia

(d) Acidified potassium permanganate solution

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

18- The experiments shown in the following table were conducted to identify three acids:

Experiment	Observation
Passing hydrogen bromide gas in hot concentrated acid (1)	Orange vapors evolves
Exposing to glass rod wet with ammonia solution to vapors of acid (2)	White cloud is formed
Adding barium nitrate solution to diluted acid solution (3)	White precipitate is formed

- Which of the following represents acids (1), (2), and (3)?

	Acid (1)	Acid (2)	Acid (3)
A	Sulphuric acid	Hydrochloric acid	Phosphoric acid
B	Hydrochloric acid	Phosphoric acid	Nitric acid
C	Nitric acid	Sulphuric acid	Phosphoric acid
d	Sulphuric acid	Hydrochloric acid	Nitric acid

19- Which of the following salts can be detected using the reagent of the confirmatory test for one of the cations in the fifth analytical group?

(a) $MgCl_2$

(b) $Fe_2(SO_3)_3$

(C) $Pb(NO_2)_2$

(d) $Ba_3(PO_4)_2$

20- 14.3 g of sodium carbonate hydrate $Na_2CO_3.10H_2O$ dissolved in water to form a 500 mL solution. Then 25 mL of this solution is titrated with 25 mL of hydrochloric acid, which of the following expresses the concentration of hydrochloric acid?

[Na=23, C=12, O=16, H=1]

(a) 0.1M (b) 0.2M (c) 0.3M (d) 0.4M

21- 200 mL of 0.01 M sodium hydroxide solution, which of the following expresses the mass of sodium hydroxide that must be added to make the concentration of the solution 0.7 M? [NaOH=40g/mol]

(a) 0.138 g (b) 0.381 g (c) 5.52 g (d) 52.5 g

22- One mole each of hydrogen gas and iodine was mixed at a certain temperature in a 2L container. At equilibrium, the remaining amount of each was 0.3 mol.

-Which of the following expresses the equilibrium constant for this reaction at the same temperature?

A) 4 b) 16

c) 0.8711 d) 21.78

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

23- 0.1 M Ammonium hydroxide (NH_4OH) solution at 25°C

- Which of the following is correct? ($K_b=1.8x10^{-5}$)

	PH	POH	∝
A	2.87	11.13	0.0134
B	11.13	2.87	0.0134
C	13	1	1
d	9.26	4.74	$1.8X10^{-5}$

6- Hydrochloric acid is added to a solid salt, gas evolves forms a black precipitate when passed through an acidified copper nitrate solution.

-Which of the following represents the solid salt?

(a) Sodium nitrate
(b) Potassium sulphide
(c) Sodium sulphite
(d) Sodium bicarbonate

24- All of the following solutions can be used to distinguish between magnesium sulphate and magnesium chloride except:

(a) Barium chloride
(b) Hot concentrated sulfuric acid
(c) Calcium bicarbonate
(d) Dilute hydrochloric acid

25- Which of the following solutions can be used to separate $Fe(OH)_2$ mixed with $Al(OH)_3$?

(a) $NaOH_{(aq)}$ (b) $NH_4OH_{(aq)}$
(c) $NaCl_{(aq)}$ (d) $HCl_{(aq)}$

26- When adding hot concentrated sulphuric acid is added to salt (X) , colorless gas evolved, and the same acid reacts with salt (Y) and violet vapors evolved turns paper wet with starch to blue , then the two salts are:

	X	Y
A	Sodium chloride	Sodium iodide
B	Sodium bromide	Sodium iodide
C	Sodium nitrate	Sodium sulphate
d	Sodium chloride	Sodium bromide

27- A mixture of copper II, lead II, and calcium nitrates.

-Which of the following expresses the correct order of substances that can be added to this mixture to separate each cation separately?

(a) Sodium carbonate, then hydrogen sulphide gas
(b) Diluted sulphuric acid, then silver nitrate solution
(c) Hydrochloric acid, then sulphuric acid
(d) Hydrochloric acid, then sodium carbonate

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

28- Dissolve 0.5 g of a pure sample of metal chloride (MCl) in water and add an excess of silver nitrate to the solution to precipitate 0.963 g of silver chloride.
-The atomic mass of metal M is equal to: (Ag=108g/mol , Cl=35.5g/mol)
(a) 39 (b) 23 (c) 40 (d) 24

29- Volume (X) L of 0.2M potassium hydroxide solution, 20mL of distilled water was added to it, then 20mL of the produced solution was titrated with a solution of sulphuric acid containing 0.1176g of acid.
-The volume of potassium hydroxide (X): (H=1, S=32, O=16,K=39)
(a) 30mL (b) 20mL (c)50 mL (d) 40 mL

30- Four saturated solutions of the following sparingly soluble at 25°C:
(1) AgCl , $K_{sp}= 1.0\times10^{-10}$ (2) PbI_2 , $K_{sp}= 4.0\times10^{-12}$,
(3) AgBr , $K_{sp}= 1.0\times10^{-8}$ (4) BiI_3 , $K_{sp}= 2.7\times10^{-15}$
Which of the following expresses the order of these solutions according to their electrical conductivity?
(a) 1 < 2 < 3 < 4 (b) 1 < 3 < 2 < 4
(c) 4 < 2 < 1 < 3 (d) 4 < 2 < 3 < 1

31- When a confirmatory reagent (X) is added to a salt solution (Y), the color of reagent (X) disappears and the salt (Y) oxidizes.
- Which of the following represents reagent (X) and salt (Y)?

	The reagent X	The salt Y
a)	Acidified potassium permanganate	sodium nitrite
b)	Magnesium sulphate	sodium carbonate
c)	Lead II acetate	sodium sulphide
d)	brown iodine solution	Sodium sulphate

32- From the following diagram:

black ppt. (Y) $\xleftarrow{(X)}$ $CuCl_{2(aq)}$ $\xrightarrow{K_2CO_{3(aq)}}$ (Z) ppt.

-Which of the following represents substance X, Y, and Z?

	X	Y	Z
a)	$AgNO_{3(aq)}$	$AgCl_{(s)}$	$KCl_{(s)}$
b)	$HCl_{(aq)} + H_2S_{(g)}$	$CuCl_{2(s)}$	$CuCO_{3(s)}$
c)	$HCl_{(aq)} + H_2S_{(g)}$	$CuS_{(s)}$	$CuCO_{3(s)}$
d)	$Na_2S_{(aq)}$	$NaCl_{(s)}$	$KCl_{(s)}$

33- 100 mL of 0.5 M calcium hydroxide is added to 200 mL of 0.6 M hydrochloric acid according to the following equation: $2HCl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_2O$
- Which of the following represents the concentration of excess reactant?
a) 0.2 M
b) 0.0667 M
c) 0.633 M
d) 0.316 M

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

24- 2.52 g of hydrated crystals of acid (A) [$A{\cdot}XH_2O$]. It was dissolved in distilled water to make a 250 mL of 0.08 M solution. 25 mL of this solution was titrated with a sodium hydroxide solution containing 0.16 g of the solute.

(Molar mass of the acid = 90 g/mol, NaOH = 40 g/mol)

-Which of the following expresses the number of water molecules (X) and the type Of acid?

(a) X = 2 and the acid is diprotic

(b) X = 1 and the acid is monoprotic

(c) X = 2 and the acid is triprotic

(d) X = 3 and the acid is triprotic

25- All of the following reactions produce substances sparingly soluble in water except:

a) Magnesium sulphate solution with potassium bicarbonate solution

b) Dilute hydrochloric acid with potassium thiosulphate salt

c) Silver nitrate solution with potassium sulphite solution

d) Carbon dioxide with calcium hydroxide solution for a short time

26- 5 g of impure sample of aluminum sulphate $Al_2(SO_4)_3$ was dissolved in water. An excess amount of ammonia solution was added until aluminum hydroxide was completely precipitated. The precipitate was separated and dried, yielding a mass of 2.03 g. Which of the following represents the percentage of aluminum in the sample? [Al=27, S=32, N=14, O=16, H=1]

a) 85.95% b) 14.05% c) 52.5% d) 8.75%

27- A solution containing (Ag^+, K^+, Cu^{2+}) cations.

-Which of the following expresses the possible color of the precipitate formed when excess of HCl solution is added and then H_2S gas is passed through this solution?

(a) Black precipitate (b) White precipitate

(c) A mixture of white and black precipitates (d) No precipitate is formed

28- Hydrochloric acid is added to a salt of (X^{2-}) anion, a gas (Y) evolves that oxidizes with the normal oxidizing agents.

-Which of the following applies to the anion (X^{2-}) and the gas (Y)?

	Anion (X^{2-})	Gas (Y)
A	Nitrite	Colorless, turns reddish brown in air.
B	sulphite	Has a pungent odor and turns acidified potassium dichromate solution from orange to green
C	sulphide	Odorless and produces a black precipitate with lead acetate II solution.
d	Carbonate	Colorless , odorless and turns lime water milky

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

29- Which of the following is not preferred for distinguishing between nitrate and nitrite anions in their salts?

(a) Diluted hydrochloric acid

(b) Hot concentrated sulfuric acid

(c) Potassium permanganate solution acidified with sulphuric acid

(d) Iron II sulfate with drops of concentrated sulphuric acid

30- Add acid (X) to three salts (A, B and C):

-In case of salt (A): a colorless gas evolves, partially oxidized into violet vapors

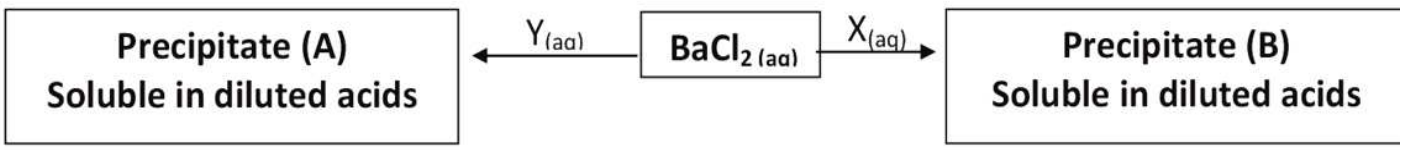
-In case of salt (B): a colorless gas evolves, partially oxidized Into orange vapors.

-In case of salt (C): a reddish-brown gas evolves.

Which of the following expresses acid (X) and the three salts?

	Acid (X)	Salt (A)	Salt (B)	Salt (C)
A	Diluted hydrochloric acid	CaI_2	$MgBr_2$	$Pb(NO_3)_2$
B	Concentrated nitric acid	$NaNO_3$	NaI	NaBr
C	Concentrated sulphuric acid	NaBr	$NaNO_3$	NaI
D	Concentrated sulphuric acid	CaI_2	$MgBr_2$	$Pb(NO_3)_2$

31- From the following diagram:



Which of the following is correct?

	solution (X)	precipitation (A)
(a)	Na_2SO_4	$Ba_3(PO_4)_2$
(b)	Na_2CO_3	$BaSO_4$
(C)	Na_2SO_4	$BaCO_3$
(d)	Na_2CO_3	$Ba_3(PO_4)_2$

32- Two salts (A and B)

- Acid of salt (A) is used to detect cation of salt (B).

- Acid of salt (B) is used to detect anion of salt (A).

	Salt (A)	Salt (B)
(a)	KCl	$CuSO_4$
(b)	Hg_2SO_4	KCl
(C)	KCl	$PbSO_4$
(d)	K_2SO_4	$NaNO_3$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

33- (12 g) of a mixture of sodium phosphate and potassium iodide is dissolved in water and excess of silver nitrate solution is added to it, forming a yellow precipitate with a mass of (X g). Then, an excess of ammonium hydroxide solution is added, leaving a precipitate with a mass of (8.5 g).

- Which of the following expresses the mass of the precipitate (X)?

(Ag=108, K=39, Na=23, I=127, P=31, O=16, N=14)

a) 6g b) 8.5g c) 15.25g d) 23.82g

34- If you know that (16 mL) of potassium hydroxide solution is needed to titrate (32 mL) of sulphuric acid.

-which of the following expresses the concentration of sulphuric acid?

a) Equal to the concentration of potassium hydroxide
b) Half the concentration of potassium hydroxide
c) Quarter The concentration of potassium hydroxide
d) Four times the concentration of potassium hydroxide.

35- Two salts (X & Y) both contain the same cation:

X: dissolves in water and dilute acids

Y: does not dissolve in water but dissolves in dilute acids

When dilute hydrochloric acid is added to each salt separately, gas (Z) is released.

- Which of the following represents gas (Z)?

(a) A white precipitate is formed when passed through potassium hydroxide solution For a short time.
(b) Produces by heating salt (X) , and salt(Y) is formed
(c) When passed through water containing salt (Y), the salt dissolves as sodium Bicarbonate.
(d) When passed through clear limewater for a long time, it becomes milky.

36- Dilute hydrochloric acid is added to Three salts (X, Y, and Z), separately, and the results were as follows:

- In the case of salt (X), a colorless gas was released that is easily oxidized.
- In the case of salt (Y), a white precipitate was formed.
- In the case of salt (Z), a gas was released that turns a paper wetted with lead (II) acetate to black.

-Which of the following represents salts (X, Y, and Z)?

	X	Y	Z
a)	$NaNO_2$	$AgNO_3$	Na_2S
b)	KNO_2	$Pb(NO_3)_2$	Na_2SO_3
c)	NH_4Cl	Ag_2SO_4	Na_2SO_3
d)	$NaNO_3$	$Ba(NO_3)_2$	Na_2S

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

37- Concentrated sulfuric acid was added to three solid salts (A, B, C).
In the case of salt (A): a colorless gas was released that was difficult to oxidize.
In the case of salt (B): colored vapors were released, and their solution could be used to detect one of the anions of the first group.
In the case of salt (C): no gas was released.
Which of the following represents salts (A, B, C)?

	Salt (A)	Salt (B)	Salt (C)
a)	$CaCl_2$	$MgBr_2$	$PbSO_4$
b)	$CaCl_2$	MgI_2	Ag_3PO_4
c)	$MgBr_2$	$NaNO_3$	Ag_3PO_4
d)	CaI_2	$MgBr_2$	$PbSO_4$

38- Four solutions are obtained by dissolving equal masses of four different substances in distilled water, all of which have the same volume.
- Which of these solutions has the lowest concentration?
(Ca=40, K=39, O=16, H=1, Li=7, Na=23, Cl=35.5)

a) LiCl b) KOH
c) NaCl d) $Ca(OH)_2$

39- A solution contains the cations of (Cu^{2+}, Pb^{2+}, and Ca^{2+}). Which of the following can be added to the previous solution to obtain a solution containing only copper cation?
(a) Dilute sulfuric acid
(b) Sodium carbonate solution
(c) Sodium nitrate solution
(d) Dilute hydrochloric acid

40- When 45 g of a pure sample of hydrated barium chloride ($BaCl_2.2H_2O$) is dissolved in 500 mL of distilled water, 84.2 mL of the resulting solution is required to precipitate all the sulphate anions produced from dissolving 10 g of hydrated sodium sulphate ($Na_2SO_4.XH_2O$) in water.
($BaCl_2.2H_2O$=244 g/mol - $BaCl_2$=208g/mol - Na_2SO_4=142g/mol)
Which of the following expresses the chemical formula of hydrated sodium sulphate?
a) $Na_2SO_4.5H_2O$
b) $Na_2SO_4.7H_2O$
c) $Na_2SO_4.10H_2O$
d) $Na_2SO_4.8H_2O$

41- Saturated solution of a sparingly soluble salt (A) is in water. Its saturated solution with a concentration of (1×10^{-4} mol/L). Given that K_{sp} of this salt is (1.08×10^{-18})
-Which of the following represents the chemical formula of salt (A)?
(a) X_2Y_3
(b) XY_3
(c) X_2Y
(d) XY_2

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

42- Two solutions of two different acids (X) and (Y), each monoprotic:

(X): Concentration 0.1 M and ionization constant $K_a = 1.8 \times 10^{-5}$

(Y): Concentration 0.1 M and ionization constant $K_a = 5.1 \times 10^{-4}$

- Which of the following describes the properties of each of the two acids (X) and (Y)?

a) (X) conducts electricity more efficiently and has a lower pH value than (Y).

b) (Y) conducts electricity more efficiently and has a higher pH value than (X).

c) (X) conducts electricity less efficiently and has a lower pH value than (Y).

d) (Y) conducts electricity more efficiently and has a lower pH value than (X).

43- Which of the following is not a product of heating magnesium bicarbonate solution?

a) Another salt of the same acid

b) A gas that oxidizes in air

c) A compound sparingly soluble in water

d) A precipitate that dissolves in dilute acids

44- A solution containing (Ag^+, Cu^{2+}, Pb^{2+}, Ca^{2+}) cations .

-Which of the following represents the correct order of steps required to obtain a Solution containing only the copper cation?

a) Add hydrochloric acid – filtration – add hydrogen sulphide gas – filtration

b) Add hydrogen sulphide gas – filtration – add hydrochloric acid – filtration

c) Add sulphuric acid – filtration – add sodium sulphide solution – filtration

d) Add sodium chloride solution –filtration– add magnesium sulphate solution–filtration

45- When adding hot, concentrated sulphuric acid salt (X), fumes are released that Turns a paper wet with starch blue.

-When barium chloride solution is added to salt solution (Y), a white precipitate is Formed that dissolves in dilute HCl.

-Which of the following represents the product of adding silver nitrate solution to Solutions of both (X and Y)?

	In the case of salt solution (X)	In the case of salt solution (Y)
a)	A yellow precipitate forms that dissolves in ammonia solution	A yellow precipitate forms that does not dissolve in ammonia solution
b)	A yellow precipitate forms that does not dissolve in ammonia solution	A yellow precipitate forms that dissolves in ammonia solution
c)	A yellowish white precipitate forms.	A yellow precipitate forms that does not dissolve in ammonia solution
d)	A white precipitate forms that dissolves in ammonia solution	A yellow precipitate forms that dissolves in ammonia solution

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

46- When 0.2 mol of the anhydrous salt XCl_2 combines with 7.2 g of water, a hydrated salt is formed with the chemical formula $XCl_2 \cdot nH_2O$ (H=1, O=16).
-Which of the following represents the value of (n)?
a) 2 b) 4 c) 6 d) 8

47- When titrating an alkaline solution of concentration (M) with an acid of Concentration (0.5 M), upon reaching the equivalence point, it was found that The volume of acid consumed is equal to the volume of the alkaline solution.
- Which of the following represents the acid and the alkaline solution?
a) Hydrochloric acid and calcium hydroxide
b) Sulphuric acid and potassium hydroxide
c) Hydrochloric acid and potassium hydroxide
d) Sulphuric acid and calcium hydroxide.

48- When equal masses of zinc react with an excess of hydrochloric acid
- Which of the following represents the reaction that produces the greatest volume Of hydrogen gas in the shortest time?
a) A zinc strip with 0.1 M acid at 25°C
b) Zinc powder with 1 M acid at 50°C
c) Zinc powder with 0.1 M acid at 25°C
d) A piece of zinc with 1 M acid at 50°C

49- 12 g of a mixture of potassium chloride and potassium carbonate salts were dissolved in water. An excess amount of magnesium sulphate solution was added to the solution, a precipitate is formed with a mass of 5 g.
Which of the following represents the percentage of potassium chloride in the mixture? (K=39, C=12, O=16, Mg=24)
a) 35.44%
b) 68.45%
c) 31.55%
d) 40.91%

50- Dilute hydrochloric acid can be used to distinguish between:
(a) Sodium carbonate and sodium bicarbonate
(b) Sodium sulfate and sodium chloride
(c) Sodium carbonate and lead bicarbonate
(d) Barium carbonate and magnesium bicarbonate

51- When hot, concentrated sulphuric acid is added to solid salt (X), a mixture of gases is released. When diluted sulphuric acid is added to a solution of salt (X), a white precipitate forms that is insoluble in dilute acids.
-The chemical formula for salt (X) is:
(a) Sodium iodide NaI
(b) Calcium bromide $CaBr_2$
(c) Calcium carbonate $CaCO_3$
(d) Lead sulphite $Pb(SO_3)_2$

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

52- When barium chloride solution is added to separate solutions of two salts, (X) and (Y), a precipitate forms with each, both precipitate dissolves in dilute hydrochloric acid.
- The anions of salts (X) and (Y) are:

(a) (X): PO_4^{3-}, Y: SO_4^{2-}
(b) (X): SO_4^{2-}, Y: CO_3^{2-}
(c) (X): PO_4^{3-}, Y: CO_3^{2-}
(d) (X): SO_4^{2-}, Y: NO_3^-

53- The opposite figure shows experiments to detect a cation in its solution using three different reagents. Which of the following represents this cation?

a) Pb^{2+}
b) Cu^{2+}
c) Fe^{2+}
d) Ca^{2+}

54- A solution contains a mixture of anions (sulphate, chloride, and sulphide).
-If you have solutions of silver nitrate, calcium hydroxide, and copper nitrate.
Which of the following is the correct order for using these solutions to separate these anions from each other as a precipitate?

(a) Copper nitrate, then silver nitrate, then calcium hydroxide
(b) Calcium hydroxide, then silver nitrate, then copper nitrate
(c) Silver nitrate, then calcium hydroxide, then copper nitrate
(d) Copper nitrate, then calcium hydroxide, then silver nitrate

55- If 7.3 g of pure hydrochloric acid is required to complete the reaction with calcium Carbonate in a sample of 12.5 g
- Which of the following is correct? (Ca=40, C=12, O=15, Cl=35.5, H=1)

(a) The sample is pure and purity percentage 100%.
(b) The sample is impure, and contains 2.5g of $CaCO_3$
(c) The sample is impure, and the percentage of impurities is 20%.
(d) The sample is impure, and the percentage of impurities is 80%.

56- When titrating two different solutions of acid (X) with two different solutions of base (Y), the results were as follows:

	M_x	V_x	M_Y	V_Y
First experiment	0.2M	10mL	0.1M	10mL
second experiment	Mx	40mL	0.25M	20mL

From the previous results, the concentration of the acid solution in the second experiment is:

a) 0.125M b) 0.025M c) 0.250M d) 0.050M

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

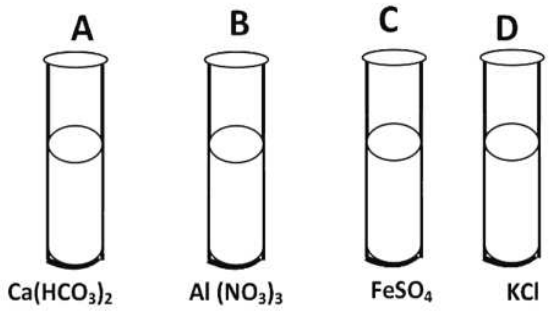
55- One of the calcium salts (Ca^{2+}) is sparingly soluble in water. Its solubility is (1×10^{-4} mol/L).

- Given that the solubility product (Ksp) of this salt is (1.08×10^{-18}) at a certain temperature.
- Which of the following represents the anion of this salt?

(a) Carbonate (CO_3^{2-})
(b) Fluoride (F^-)
(c) Phosphate (PO_4^{3-})
(d) Sulphate (SO_4^{2-})

Essay questions:

1- You have four test tubes containing different salt solutions:



1- Write the chemical name of the reagent used to distinguish between the solid Salts of the four solutions by one experiment.
2- Which of the four solutions gives a precipitate with an excess of sodium Hydroxide solution?
3- Which of the above solutions gives a gas and a precipitate when dilute sulphuric Acid is added?
4- Which of the above salts cannot detects its cation by a normal chemical reagent?

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

2- The opposite figure shows an experiment to detect the anion of salt (X) and the cation (Z). Study the figure well and then answer the following questions:

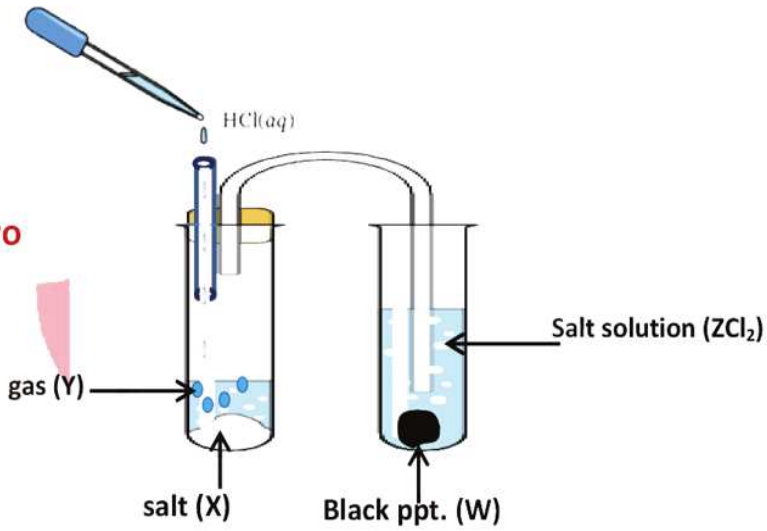
(1) Write the chemical formula for each of:

(a) Salt (ZCl_2)

(b) Black precipitate (W)

(2) Write the chemical formula for two other salts instead of salt (ZCl_2) that exhibit the same observations.

The anion of either must be nitrate.



.....

.....

.....

.....

.....

3- The following diagram represents the chemical reactions of some salts:

$X_{(s)}$ + $HCl_{(aq)}$ —dil.→ $Y_{(aq)}$ + $Z_{(g)}$

$Y_{(aq)}$ —Ammonia solution→ (B) ppt.

$Z_{(g)}$ —Copper II nitrate solution→ (A) Black ppt.

The precipitate (B) is white; it turns greenish white upon expose to air

- Write the chemical formulas for each of the following:

1-Salt (X): .....

2-Salt (Y): .....

-Write the chemical names of precipitates (A) and (B):

.....

.....

.....

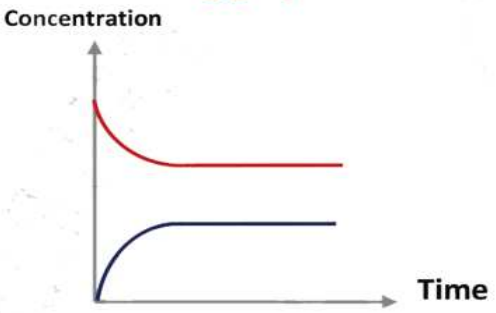
.....

.....

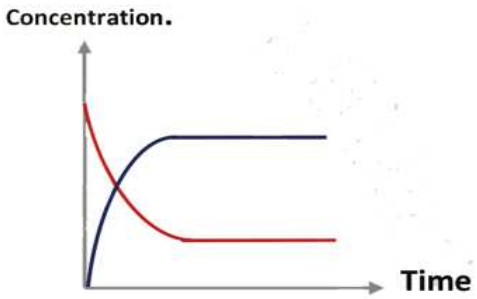
موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

الوحدة الثالثة

1-From the following graphs:



(Y)



(X)

Which of the following statements is correct?

(a) Graph(X): Kc=1 , the backward reaction is the predominant
(b) Graph(Y): Kc=1 , the forward reaction is the predominant
(C) Graph(X): Kc>1 , the forward reaction is the predominant
(d) Graph(Y): Kc>1 , the backward reaction is the predominant

2- In the following equilibrium reaction:

$$Ca(OH)_{2(s)} \rightleftharpoons CaO_{(s)} + H_2O_{(v)}$$

Which of the following changes leads to an increase in the mass of calcium oxide?

(a) Reducing the mass of calcium oxide by half
(b) Withdrawal 10 mL of water vapor
(c) Doubling the mass of calcium hydroxide
(d) Adding 10 mL of water vapor

3- 50 mL of a 0.2 M ammonium hydroxide (NH_4OH) solution was diluted by adding 450 mL of distilled water. What is the dissociation degree (α) of the solution after dilution?

(Ammonia ionization constant $K_b = 1.8 \times 10^{-5}$)

(a) 0.03 (b) 0.0095
(c) 0.2 (d) 0.0009

4-Test tubes (A) and (B) each contain a saturated calcium carbonate solution.

$$CaCO_{3(s)} \rightleftharpoons Ca^{2+}_{(aq)} + CO_3^{2-}{}_{(aq)}$$

- In tube (A), a few drops of hydrochloric acid were added.
- In tube (B), a few drops of calcium chloride solution were added.
- Which of the following is true?

(a) The amount of precipitate gradually increases in (A) and gradually decreases in (B)
(b) The amount of precipitate gradually decreases in (A) and gradually increases in (B)
(c) The amount of precipitate gradually increases in both tubes.
(d) The amount of precipitate gradually decreases in both tubes.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

5- Drops of solution (X) were added to a quantity of distilled water, and a Decrease in the POH value of the water was observed.

- Which of the following describes solution (X)?

(a) Base pOH has a value of 8
(b) Acid pOH has a value of 5
(c) Base pH has a value of 8
(d) Acid pH has a value of 5

6- In the following balanced reaction:

$$C_{(S)} + CO_{2\,(g)} \rightarrow 2CO_{(g)}$$

-If the total pressure of this system at equilibrium is 40 atm and the partial pressure of carbon monoxide is 31.6 atm, then the value of Kp for this system is equal to:

(a) 8.487 (b) 3.760
(c) 118.87 (d) 131.98

7- Which of the following reactions has a (Kc) value equal to the concentration of the products?

(a) $C_{(s)} + O_{2(g)} \rightleftharpoons CO_{2(g)}$
(b) $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
(C) $H_{2(g)} + O_{2(g)} \rightleftharpoons 2H_2O_{(g)}$
(d) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

8- 5L of saturated zinc sulphide (ZnS) solution was cooled from 60°C to 25°C, 1.53×10^{-5} g of the salt is precipitated. If you know that the solubility product Ksp of the salt at 25°C is equal to 1×10^{-21}

- Which of the following expresses the solubility product constant (Ksp) of ZnS at 60°C? (ZnS = 97 g/mol)

(a) $1 X 10^{-15}$
(b) $1 X 10^{-21}$
(C) $3.16X10^{-8}$
(d) $3.16X10^{-11}$

9- Which of the following equations represents a process where the rate of the forward reaction is equal to the rate of the backward reaction?

a) $AgNO_{3(aq)} + NaCl_{(aq)} = AgCl_{(s)} + NaNO_{3(aq)}$.
b) $HCl_{(aq)} + H_2O_{(l)} = H_3O^+_{(aq)} + Cl^-_{(aq)}$
c) $N_{2(g)} + 3H_{2(g)} = 2NH_{3(g)}$ (open vessel).
d) $CH_3COOH_{(aq)} + H_2O_{(l)} = CH_3COO^-_{(aq)} + H_3O^+_{(aq)}$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

10- Hydrocyanic acid solution is in equilibrium according to the following equation:

$$HCN_{(aq)} + H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq)} + CN^-_{(aq)}$$

-Which of the following occurs when a few drops of HCl are added to this solution?

a) The degree of acid dissociation increases.
b) The concentration of the CN^- ion increases.
c) The degree of acid dissociation decreases.
d) The equilibrium state is unaffected.

11- From the following equilibrium reaction: $2X_{2\,(g)} + Y_{2\,(g)} \rightleftharpoons 2X_2Y_{\,(g)}$ - heat

- Which of the following is correct regarding its effect on this reaction?

a) Adding (X_2) increases the concentration of the products and increases the Amount of energy released.
b) Adding (Y_2) increases the concentration of the products and increases the Amount of energy absorbed.
c) Withdrawing heat from the reaction increases the value of the equilibrium constant
d) Increasing the heat in the reaction decreases the value of the equilibrium constant

12- Which of the following reactions is the fastest?

a) A 10 g magnesium ribbon with 25 mL of 0.2 M H_2SO_4 at room temperature.
b) A 5 g magnesium ribbon with 50 mL of 0.1 M H_2SO_4 at 35°C.
c) A 10 g magnesium powder with 50 mL of 0.1 M H_2SO_4 at room temperature.
d) A 5 g magnesium powder with 25 mL of 0.2 M H_2SO_4 at 35°C.

13- Solution (X) has a hydrogen ion concentration $[H^+]$ of 1.0×10^{-9} M at 25°C.

-Which of the following represents solution X?

(a) A solution of a base, pOH has a value of 9.
(b) A solution of an acid, pOH has a value of 5.
(c) A solution of a base, pH has a value of 9.
(d) A solution of an acid, pH has a value of 5.

14- In the following equilibrium reaction: $2NO_{2\,(g)} \rightleftharpoons N_{2\,(g)} + 2O_{2\,(g)}$

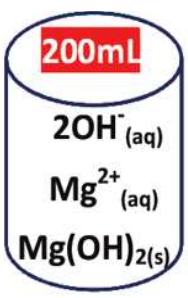
The total pressure at equilibrium is 3.2 atm, the partial pressure of NO_2 is 2 atm, and the partial pressure of O_2 is 1 atm.

-Which of the following represents the value of K_p for the reaction?

a) 0.1 b) 0.2 c) 0.05 d) 5

15- From the opposite figure, every 50 mL of solution contains 2×10^{-4} mol of solute. Which of the following represents the value of K_{sp} for $Mg(OH)_2$ salt?

a) 4×10^{-6}
b) 2.5×10^{-7}
c) 1.6×10^{-8}
d) 8×10^{-5}



موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

16- Which of the following does not represent a reversible reaction?

(a) Preparing ammonia gas from its elements in a closed container.

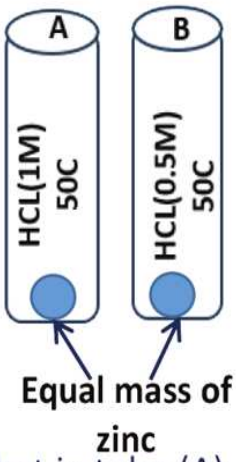
(b) (b) Adding acetic acid to ethyl alcohol.

(c) Addition of magnesium sulfate solution to sodium carbonate solution.

(d) Adding iron (III) chloride solution to ammonium thiocyanate solution

17- Study the tubes (A) and (B) in the illustrated figure:

-Which of the following describes the result of the reaction In each tube?



(a) The rate of disappearing the piece of zinc in tube (A) is Greater than that in tube (B).

(b) The rate of disappearing the piece of zinc in tube (B) is Greater than that in tube (A).

(c) The amount of hydrogen gas produced in tube (B) is greater Than that in tube (A) upon complete dissolution of the zinc

(d) The amount of hydrogen gas produced in tube (B) is less than that in tube (A) Upon complete dissolution of the zinc

18- Which of the following expresses the effect of heat on a system in equilibrium?

(a) Lowering the temperature reduces the value of Kc in exothermic reactions.

(b) Raising the temperature increases the value of Kc in exothermic reactions.

(c) Lowering the temperature reduces the value of Kc in endothermic reactions.

(d) Raising the temperature reduces the value of Kc in endothermic reactions.

19- All of the following solutions have a degree of dissociation ($\alpha \approx 1$) except:

(a) Hydrochloric acid (1M)

(b) Sodium hydroxide (1M)

(c) Nitric acid (1M)

(d) Boric acid (1M)

20- Acetic acid ionizes in its solution according the following equation:

$$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$$

Which of the following occurs when drops of sodium hydroxide are added to this solution?

(a) Acid dissociation increases and pH value of the solution decreases.

(b) Acid dissociation increases and pH value of the solution increases.

(c) The rate of acid formation increases and pH value of the solution decreases.

(d) The rate of acid formation increases and pH value of the solution increases.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

21- The following table shows the number of moles of reactants and products at a given temperature in the following equilibrium reaction: $2NOCl_{(g)} \rightleftarrows 2NO_{(g)} + Cl_{2(g)}$

Substance	Cl_2	NO	NOCl
Number of moles at equilibrium	3	1.5	3

-If the value of Kc for the reaction at the same temperature = 0.25, then the volume of the reaction vessel in liters is:

a) 1 b) 2 c) 3 d) 4

22- Which of the following choices does not represents equilibrium system?:

(a) Dissolving ammonia gas in water
(b) A reversible reaction with constant concentrations.
(c) Strong heating of hydrated barium chloride salt.
(d) A saturated solution of a sparingly soluble salt.

23- (A,B) Two solutions of HCl acid:

- Solution (A): Its volume one liter and contains one mole of acid.
- Solution (B): Its volume one liter and contains half a mole of acid.

16.25 g of zinc are added to each solution at the same temperature.

-Which of the following is correct? (Zn=65)

(a) The reaction rate in solution (A) is faster, and the amount of hydrogen produced In (A) is greater.
(b) The reaction rate in solution (A) is faster, and the amount of hydrogen Produced is equal in both solutions.
(c) The reaction rate in solution (B) is faster, and the amount of hydrogen produced In (B) is greater.
(d) The reaction rate in solution (B) is faster, and the amount of hydrogen Produced is equal in both solutions.

24- In the following equilibrium system:

$$2H_2O_{(l)} \rightleftharpoons 2H_{2(g)} + O_{2(g)} \ , \Delta H = +286 \text{ kJ}$$

-Which of the following choices is correct when lowering the temperature?

(a) The equilibrium constant Kc increases and the rate of water dissociation Decreases.
(b) The equilibrium constant Kc increases and the rate of water formation Decreases.
(c) The equilibrium constant Kc decreases and the rate of water dissociation Decreases.
(d) The equilibrium constant Kc decreases and the rate of water formation Decreases.

25- The following reaction at equilibrium state at a certain temperature:

$$2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)}$$

The total pressure at equilibrium = 2 atm, and the partial pressure of H_2 and I_2 is:

$$(P_{H_2} = P_{I_2} = 0.4 \text{ atm})$$

-Which of the following represents the value of K_p when the volume of the container is reduced by half?

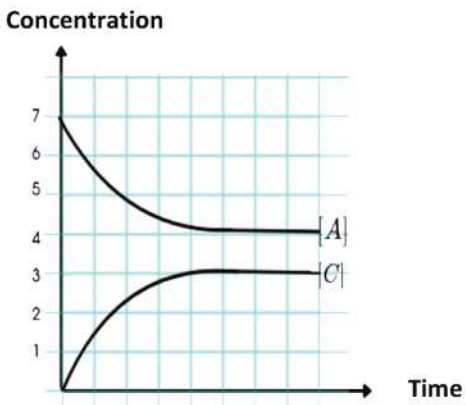
(a) 0.05 (b) 0.11 (c) 0.25 (d) 0.40

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

26- Two solutions (A) and (B) have the same volume and initial concentration.
Sample (A): weak acid solution (such as CH_3COOH).
Sample (B): weak base solution (such as NH_4OH).
Both samples are diluted by adding 100 mL of distilled water to each.
-Which of the following is correct?
(a) The pH decreases in both samples (A) and (B).
(b) The pH of sample (A) increases and the pH of sample (B) decreases.
(c) The pH increases in both samples (A) and (B).
(d) The pH of sample (A) decreases and the pH of sample (B) increases.

27- 500 mL of sodium hydroxide (NaOH) solution its pH = 12.0
-The mass of dissolved sodium hydroxide (NaOH) dissolved in this solution is:
(Na=23, O=16, H=1)
(a) 2.0 g (b) 0.2 g (c) 0.4 g (d) 4.0 g

28- The corresponding figure represents one of the gas reactions.
-Which of the following represents the reverse reaction equation for the reaction shown and its equilibrium constant value?
(a) A⇌C, and Kc=0.75
(b) C⇌A, and Kc=1.33
(c) A⇌C, and Kc=1.33
(d) C⇌A, and Kc=0.75



29- Which of the following is true for reactions (A) and (B)? (When each is performed in a sealed container)?

Reaction (A)	Reaction (B)
$N_{2(g)} + 3H_{2(g)} = 2NH_{3(g)}$	$Mg_{(s)} + 2HCl_{(aq)} = MgCl_{2(aq)} + H_{2(g)}$

a) Both reactions reach equilibrium at the same time.
b) Neither reaction reaches equilibrium.
c) Reaction (A) reaches equilibrium, but reaction (B) does not.
d) Reaction (B) reaches equilibrium, but reaction (A) does not.

30- Two solutions of two weak acids (HA) and (HB) have a pH = 3 for each
- Acid HA has a concentration of 0.1 M.
- Acid HB has a concentration of 0.01 M.
Which of the following is correct for acids HA and HB?
a) Acids HA and HB have a different $[OH^-]$
b) Acids HA and HB have the same value of K_a.
c) The value of K_a for acid HB is greater.
d) The value of K_a for acid HA is greater.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

31- Which of the following equilibrium reactions shifts to the forward reaction by increasing the volume of the container?

a) $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$

b) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$

c) $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

d) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

32- Two tubes (A, B) each contain equal masses of an active metal and the same acid. If the reaction in tube (B) is ended in a shorter time than in tube (A).
Which of the following is the reason of the different in reaction time of the two reactions?

a) Division of the metal in tube (A)

b) Adding a catalyst to tube (A)

c) Increasing the temperature of tube (B)

d) Adding water to tube (B)

33- Four solutions have the same concentration:

1- HCl solution　　2- NaOH solution

3- CH_3COOH acid solution　　4- NH_4OH solution

-The order of these solutions according to the hydronium ion concentration is:

a) 1 > 3 > 4 > 2　　b) 2 > 4 > 3 > 1

c) 1 > 2 > 3 > 4　　d) 1 > 3 > 2 > 4

34- A saturated lead (II) chloride ($PbCl_2$) solution is in equilibrium according to the Following equation: $PbCl_{2(s)} \rightleftharpoons Pb^{2+}_{(aq)} + 2Cl^-_{(aq)}$

-Which of the following is correct regarding the solubility of $PbCl_2$ when a small Amount of each of the following salts is added separately?

a) Solubility decreases with addition of sodium sulphate solution.

b) Solubility increases with addition of sodium nitrate solution.

c) Solubility decreases with addition of lead (II) acetate solution.

d) Solubility increases with addition of potassium nitrate solution.

35- Lead (II) chloride is sparingly soluble in water, its solubility product [Ksp=1.2x 10^{-5}] at 25°C

-Which of the following represents the volume of a saturated solution containing 0.1 g of salt at the same temperature? ($PbCl_2$ = 278 g/mol)

(a) 25 mL　(b) 50 mL　(c) 100 mL　(d) 150 mL

36- In the following equilibrium reaction: $A_{(g)} + B_{(g)} \rightleftharpoons 2C_{(g)}$

- The concentrations of reactants and products at 200°C in 1L container are:
[A] = 0.200 M, [B] = 3.00 M, [C] = 0.500 M

- Which of the following represents the number of moles of (A) that must be added To make [C] = 0.700 M at the same temperature?

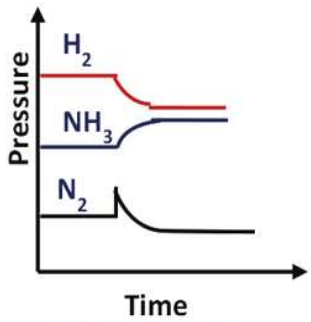
a) 0.225 mol　b) 0.305 mol　c) 0.417 mol　d) 0.610 mol

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

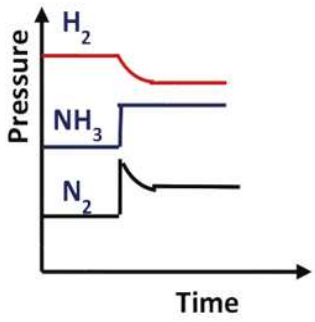
37- Ammonia is prepared in industry by the Haber-Bosch reaction according to the equation: $N_{2\,(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

Which of the following graph represents the effect of increasing the partial pressure of nitrogen gas on the previous equilibrium?

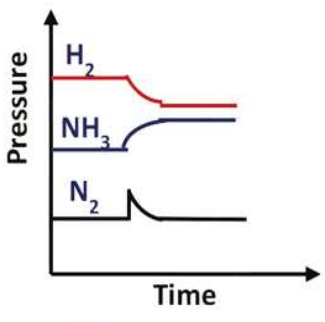
(a)



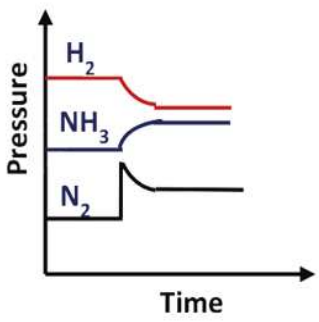
(b)



(C)



(d)



38- All of the following can express system at equilibrium state except:

(a) A saturated solution of salt that is sparingly soluble in water

(b) The dissolution of carbon dioxide gas in water in a closed container

(c) The dissolution of acetic acid in water in an open container

(d) Obtaining oxygen gas by decomposing hydrogen peroxide

39- The following table shows the pH values of four solutions of different acids with the same concentration:

solution	pH
A	1
B	6
C	3

-The correct order of these solutions according to their ionization constant Ka is:

(a) B > A > C

(b) A > B > C

(c) C > B > A

(d) A > C > B

40- The following balanced reaction at a certain temperature:

$$2A_{(aq)} + 3B_{(aq)} \rightleftharpoons 2C_{(aq)} + 3D_{(aq)}$$

If the concentrations of the reactants and products at equilibrium are:

[A] = 1.5M, [B] = 2.3M, [C] = 3M, [D] = 4.5M

By increasing the concentration of substance (A) and the reaction reaching equilibrium again at the same temperature, then the concentrations at equilibrium become as follows: [A] = 2.5M, [C] = 4M, [D] = 6M

-Which of the following expresses the concentration of substance (B) at equilibrium?

a) 29.96 M

b) 6.98 M

C) 3.83 M

d) 2.64 M

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

41- According to the following balanced reaction: $COCl_{2\,(g)} = CO_{(g)} + Cl_{2\,(g)}$
When a quantity of $COCl_{2\,(g)}$ is placed in a closed container with a volume of (1) L, at equilibrium the pressure of $Cl_{2\,(g)}$ is equal to (0.3) atm and the total pressure is equal to (0.8) atm, then the value of Kp is:

a) 0.3
b) 2.22
c) 0.45
d) 1.5

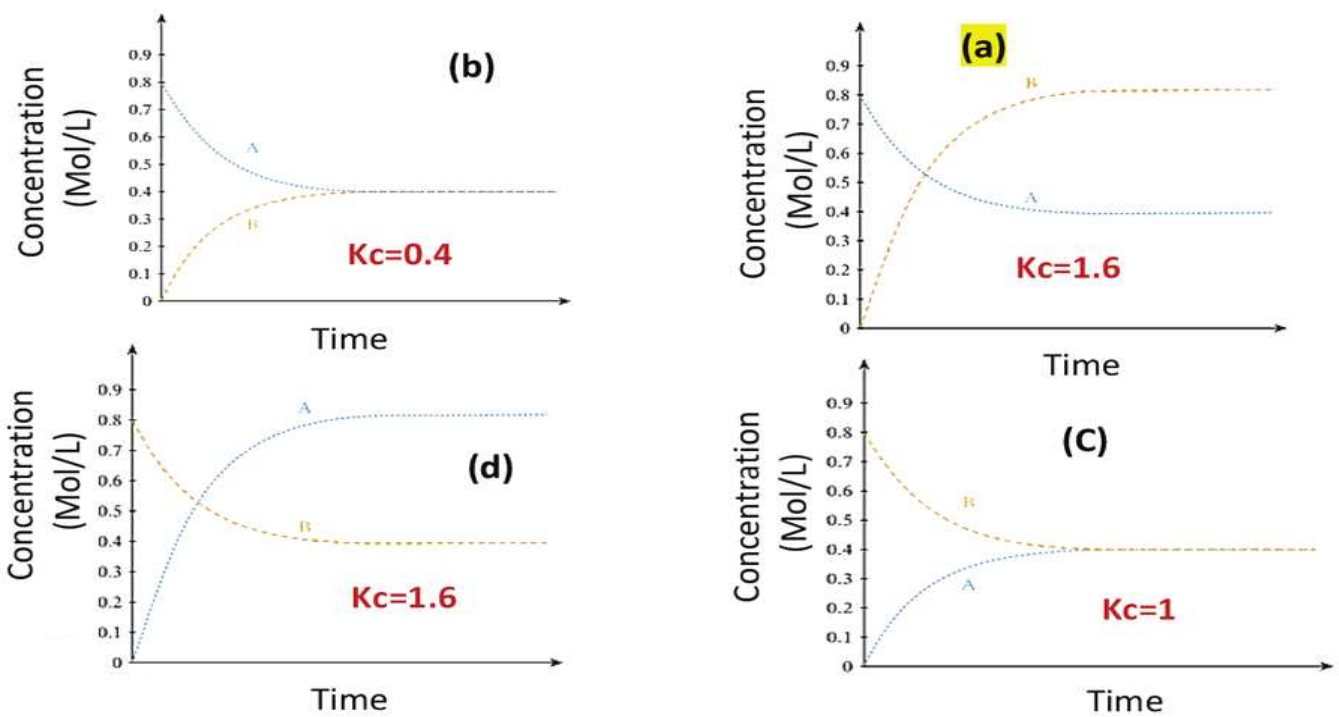
42- 16- Acetic acid solution (X) of 0.1M, diluted by adding water to get a solution (Y) Of (0.01M).
-Which of the following does not describe solutions (X) and (Y)?

(a) The electrical conductivity of solution (Y) is higher than that of solution (X)
(b) The concentration of hydronium ions in solution (X) is higher than that in (Y)
(c) The pH value of solution (Y) is higher than that of solution (X)
(d) The ionization constant of acid (X) is higher than that of (Y)

43- If you know that the solubility of magnesium carbonate $MgCO_3$ in water at a temperature of 25ºC is equal to (4.4×10^{-5} mol / 100 mL), then the solubility product (Ksp) of this salt is equal to:

(a) 4.16×10^{-11}
(b) 1.9×10^{-7}
(c) 19.36×10^{-10}
(d) 6.44×10^{-4}

35- When (0.8) moles of substance (A) are placed in a (1L) and equilibrium is reached according to the following equation: $A_{(aq)} \rightleftharpoons 2B$
It is found that (0.4) moles of substance (A) are converted to (B).
Which of the following represents the equilibrium state and equilibrium constant for this reaction?



موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

36- Which of the following reactions obeys the law of mass action?

a) $HCl_{(aq)} + KOH_{(aq)} = KCl_{(aq)} + H_2O_{(l)}$ in an open container

b) $2NaNO_{3(s)} = 2NaNO_{2(s)} + O_{2(g)}$ in an open container

c) $CaCl_{2(aq)} + (NH_4)_2CO_{3(aq)} = 2NH_4Cl_{(aq)} + CaCO_{3(s)}$ in a closed container

d) $CaCO_{3(S)} = CaO_{(S)} + CO_{2(g)}$ in a closed container

37- The following equation represents a hypothetical reaction in a closed vessel at Equilibrium:

$$A_{(s)} + B_{(l)} \rightleftharpoons C_{(g)} + D_{(g)}, \quad \Delta H = 84.3 \text{ kJ}$$

· Which of the following factors reduces the number of moles of substance (C)?

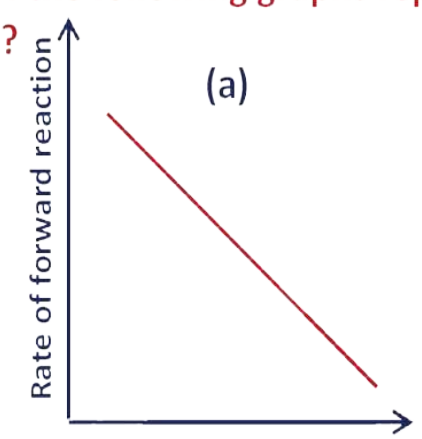
(a) Adding a small amount of substance (A) to the reaction medium

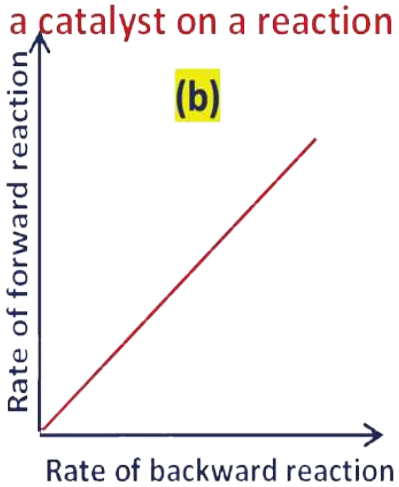
(b) Removing a small amount of substance (D) from the reaction medium

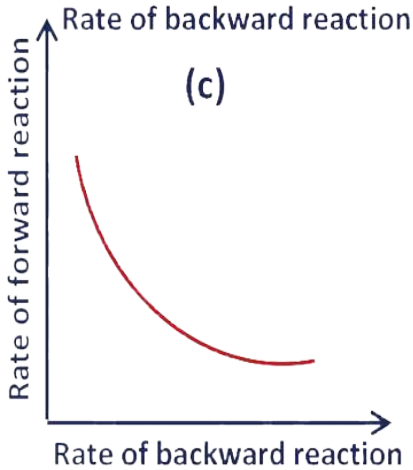
(c) Decreasing vessel volume

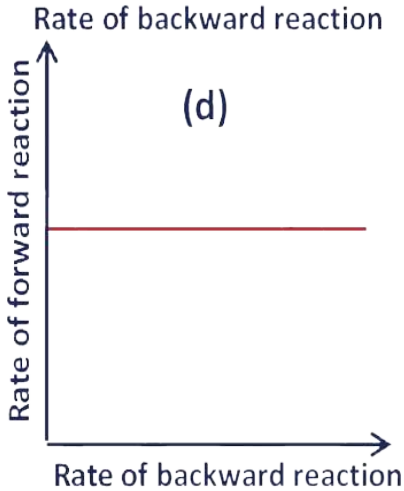
(d) Increasing temperature

38- Which of the following graphs represents the effect of a catalyst on a reaction at equilibrium?









39- Hydrocyanic acid (HCN) solution has a pH = 4.7 and ionization constant ($K_a = 6.2 \times 10^{-10}$). The number of moles of acid dissolved in 300 mL of the solution is:

a) 0.19 b) 0.47 c) 0.64 d) 0.14

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

40- When 0.2 mol of hydrazine gas is placed in a closed container of a volume (1L), equilibrium is established, that represented by the following equation:

$$N_2H_{4\,(g)} \rightleftharpoons N_{2\,(g)} + 2H_{2\,(g)},\ \Delta H < 0$$

At equilibrium, the hydrogen gas concentration $[H_2] = 0.2$ M. Upon raising the temperature of the system and reaching equilibrium again, the nitrogen gas $[N_2]$ is:

a) 0.08 M b) 0.20 M c) 0.30 M d) 0.10M

41- The ionic product of water (K_W) increases with increasing temperature.
-Which of the following occurs when the temperature of water is raised?

(a) The concentration of hydrogen ions increases, the pH of the water increases, and It becomes acidic on litmus solution.

(b) The concentration of hydroxyl ions increases, the pOH value of the water Decreases and it becomes alkaline on litmus solution.

(c) The concentration of hydroxyl ions increases, the pOH value of the water Decreases and it remains neutral on litmus solution.

(d) The concentration of hydrogen ions increases, the pH of the water increases, and It remains neutral on litmus solution.

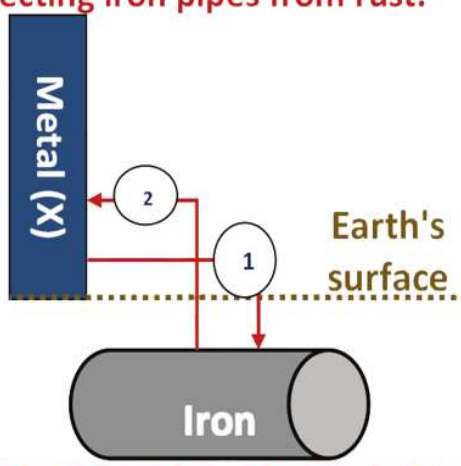
42- The opposite figure illustrates one method of protecting iron pipes from rust.
- Which of the following represents metal (X)?

a) It does not replace hydrogen ions in acids, so the electron direction is (2).

b) It reduces iron ions in its solution, so the electron direction is (1).

c) Its ions are reduced by iron atoms, so the electron direction is (1).

d) Its oxidation potential is higher than iron, so the electron direction is (2).



43- When a spoon is coated with gold using a cell containing an electrolyte solution of $AuCl_3$, 0.5 mol of electrons pass into the solution. (Au=197g/mol)
Which of the following represents the changes that occur during this electrolysis?

	Increase in the mass of the spoon	the concentration of gold ions in the solution
a)	10.94g	decreases
b)	32.8g	increases
c)	32.8g	remains constant
d)	10.94g	remains constant

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

44- The following equilibrium reaction in a closed vessel:

$$2A_2X_{(g)} + XY_{2(g)} \rightleftharpoons 3X_{(s)} + 2A_2Y_{(g)} \ , \ \Delta H < 0$$

(Yellow)

-Which of the following is true?

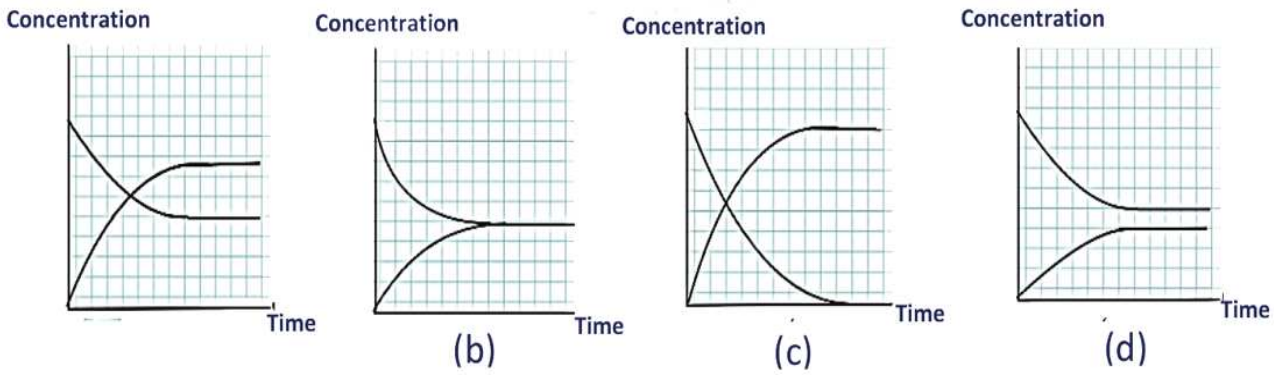
(a) Adding more of substance (X) shifts the equilibrium backward

(b) When the container is placed in a cooling mixture, the partial pressure of Gas XY_2 increases

(C) The mass of the precipitate increases by increasing pressure

(d) The volume of A_2Y decreases as the volume of the container decreases

45- Which of the following diagrams represents the relationship between the concentrations of products and reactants when a piece of magnesium metal is placed in a dilute sulfuric acid solution? (C)



(b) (c) (d)

46- When a solution of a weak monoprotic acid is diluted by adding water, doubling its volume:

Which of the following happens to the value of α and the pH?

a) The value of α decrease and becomes (1/1.414 α), and the pH of the solution decreases.

b) The value of α increase and becomes (1.414 α), and the pH of the solution increases.

c) The value of α doubles, and the pH of the solution increases.

d) The value of α is halved, and the pH of the solution decreases.

47- If the Ksp value of AgCl salt is 1.6×10^{-10}, then the mass of the salt dissolved in 50 mL of water is: (AgCl = 143.5 g/mol)

a) 1.6×10^{-10} g

b) 0.905×10^{-4} g

c) 1.26×10^{-5} g

d) 1.81×10^{-4} g

48- In the following equilibrium reaction: $2NO + O_2 \rightleftharpoons 2NO_2$

- Which of the following describes what happens in this case?

a) NO and O_2 react in equal mass proportions.

b) The rate of formation of NO_2 is twice the rate of consumption of O_2.

c) The rate of consumption of O_2 is equal to the rate of formation of NO_2.

d) At equilibrium, the volumes of the reactants and products are equal.

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

49- The following equation represents the reaction that occurs between nitric Oxide and hydrogen under certain conditions:

$$2NO_{(g)} + 2H_{2(g)} \rightleftharpoons N_{2(g)} + 2H_2O_{(v)}$$

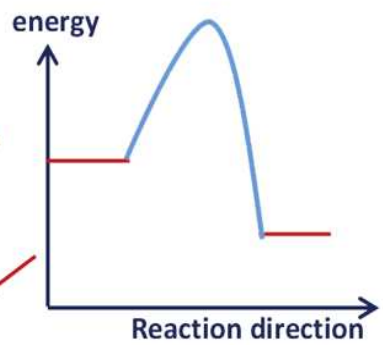
-If 0.1 mol of nitric oxide is mixed with 0.05 mol of hydrogen in a 1 L closed container at a certain temperature. At equilibrium the number of moles of (NO) in the container is found to be 0.062 mol.

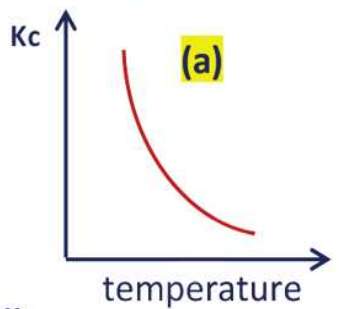
Which of the following represents the value of Kc for this reaction at the same temperature?

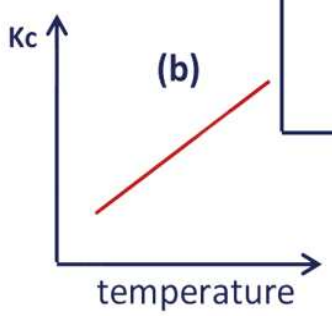
a) 1.86
b) 3.13
c) 49.56
d) 94.62

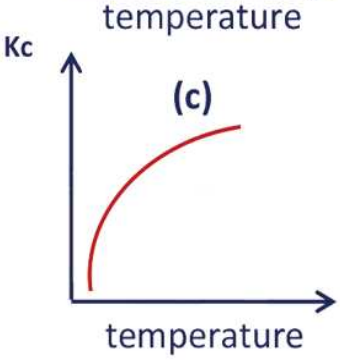
50- The opposite figure shows the energy diagram for a reversible reaction at equilibrium:

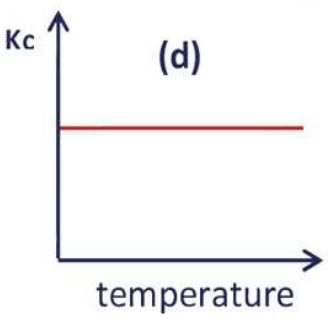
- Which of the following graphs represents the Relationship between Kc and temperature for this reaction?









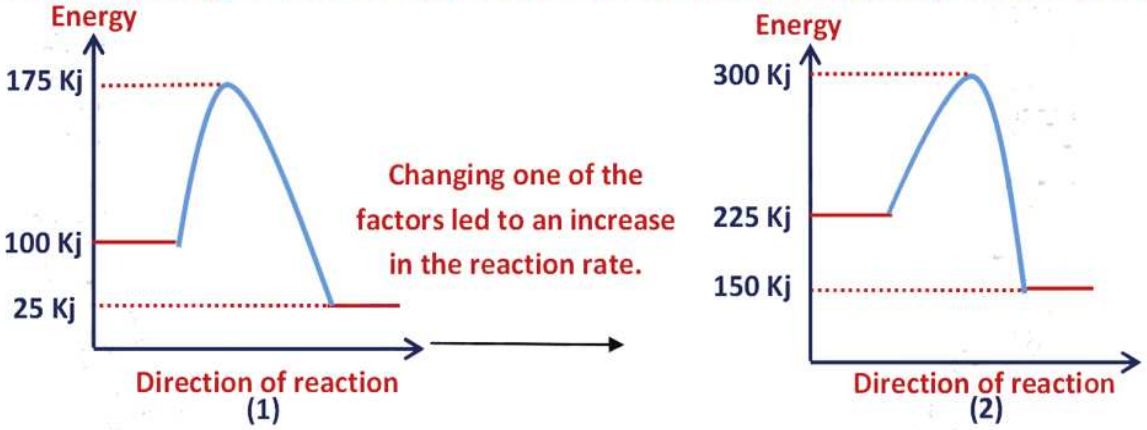


51- Which of the following changes a system from reversible to complete?

(a) Add a few drops of acetic acid after the ethyl acetate ester has formed
(b) Adding an excess of water to a saturated solution containing an insoluble amount of Silver nitrate
(c) Closing the container containing zinc reacts with concentrated sulphuric acid
(d) Closing the container in which nitrogen and hydrogen gases react to prepare ammonia

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

52- Figure (1) represents a chemical reaction, and Figure (2) represents the same reaction after a change in one of the factors that caused an increase in the reaction rate.



Which of the following represents this factor?

(a) Increasing the reaction temperature
(b) Increasing the surface area of the reactants
(c) Adding a catalyst to the reaction medium
(d) Increasing the number of moles of reactants per unit volume

53- When 0.2 mol of sulphur trioxide gas is heated in a closed container of one liter, 10% of it decomposes into sulphur dioxide and oxygen gases upon reaching Equilibrium.

-Which of the following represents the value of K_C for this reaction.

a) 1.2×10^{-4} b) 1.1×10^{-2} c) 90 d) 8100

54- One liter of alkaline solution contains (0.25) mol and has a degree of dissociation of (2×10^{-2})M. Its pOH value is:

a) 11.7 b) 11.45 c) 2.55 d) 2.3

55- When water is added to a sodium hydroxide solution:

a) The concentration of hydroxide ions decreases and the pOH value decreases
b) The concentration of hydroxide ions increases and the pH value decreases
c) The number of produced ions remains constant and the pH value increases
d) The number of produced ions remains constant and the pOH value increases

56- From the following ionic equilibrium: $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$

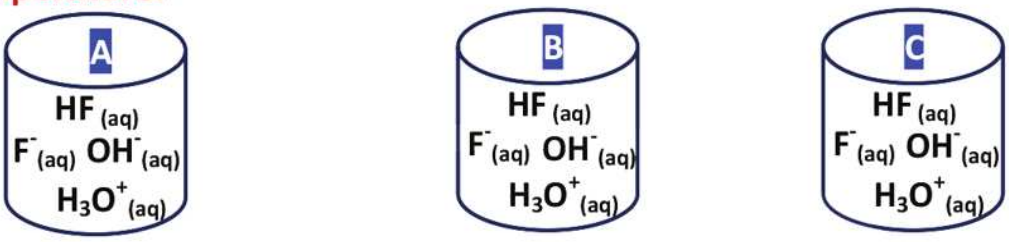
-Which of the following is correct when each of the following substances is added?

(a) Diluted HCl: The concentration of hydrogen ions increases, and the pH increases.
(b) Water: The concentration of hydrogen ions decreases, and the pOH value increases.
(c) NaOH solution: The concentration of hydrogen ions decreases, and the pH increases.
(d) C_2H_5OH: The concentration of hydrogen ions increases, and the pOH value decreases

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

Essay Questions:

1- The following figure shows three solutions (A, B, and C) of hydrofluoric acid at room temperature:



M = 0.4M

M = 0.28M

M = 0. 02M

$Ka = 6.7 \times 10^{-4}$

-Study the figure and then answer:

(1) Which solution has the highest pH value?

(2) Which solution has the highest fluoride ions concentration?

(3) What is the Ka value of the solution (B)?

(4) Which acid solution has a dissociation percentage= 4.9%?

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

الوحدة الرابعة

1- A few drops of Na_2S solution were added to the cathode half-cell in a Daniel cell.

- Which of the following is correct?

(a) The (emf) of the cell increases.

(b) The cell consumption time decreases.

(c) The concentration of Cu^{2+} cations increases.

(d) The current reverses and the (emf) value decreases.

2- In the following reaction: $5Cl^- + 8H^+ + MnO_4^- \rightarrow \frac{5}{2} Cl_2 + 4 H_2O + Mn^{2+}$

$(Cl_2 / 2Cl^- = +1.36\ V,\ Mn^{2+} / Mn^{7+} = -1.52\ V)$

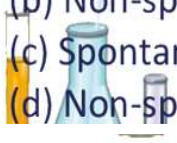
-Which of the following represents the type and value of (emf) of the reaction?

(a) Spontaneous, emf = + 0.16

(b) Non-spontaneous, emf = - 2.88 V

(c) Spontaneous and, emf = - 0.16 V

(d) Non-spontaneous, emf = + 2.88 V



3-The following table shows the components of two galvanic cells and the standard potential value for each:

Cell number	Anode	Cathode	emf
1	X	Ag	0.80 V
2	Y	Ag	1.56V

- If a galvanic cell with electrodes (X, Y) is formed, the (emf) of the cell is equal to:

(a) +2.36 V (b) - 2.36 V

(C) +0.76 V (d) - 0.76 V

4- The following table shows standard reduction potential of three metals (A, B, C)

A	B	C
-0.44	+0.34 V	+0.8

-When metals (A) and (B) are each covered with a layer of metal (C), which of the following best describes the type of protection?

(a) Anodic protection for (A), and cathodic protection for (B)

(b) Cathodic protection for (A), and cathodic protection for (B)

(c) Anodic protection for (A), and anodic protection for (B)

(d) Cathodic protection for (A), and anodic protection for (B)

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

5- When bauxite ore is analyzed electrically, which of the following statements describe the result of the reaction?

(a) Hydrogen gas evolves at cathode and oxygen gas evolves at anode.
(b) Aluminum metal is deposited at cathode and oxygen gas is formed at the anode.
(c) Aluminum metal is deposited at cathode and hydrogen gas is formed at anode.
(d) Oxygen gas evolves at cathode and hydrogen gas rises at anode.

6- Three metals (A, B, and C), are ordered according to their reducing agent Strength as follows: [A > B > C]

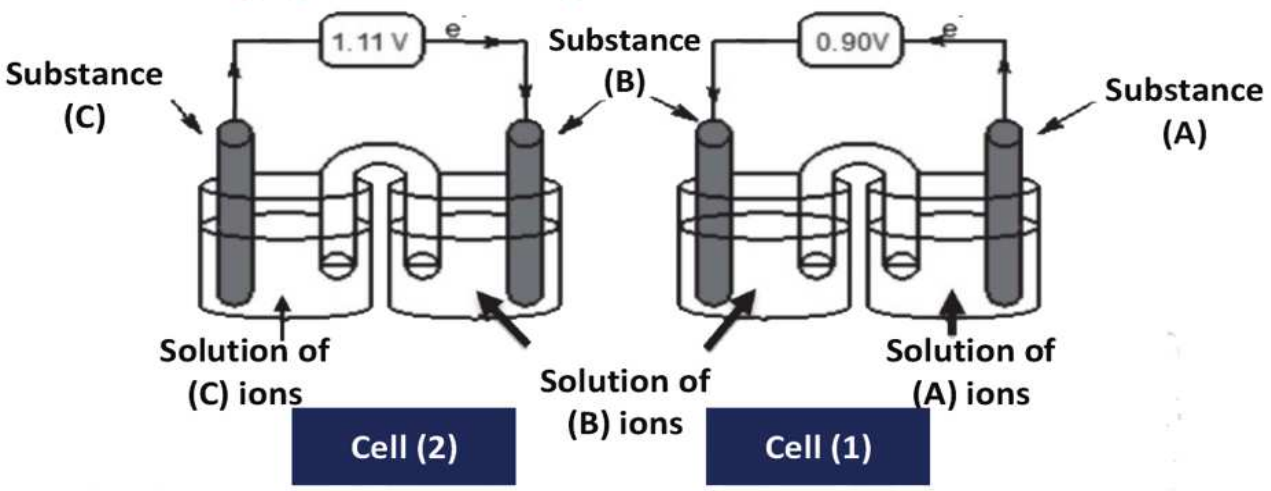
-When purifying metal (B), which contains impurities of (A) and (C), using an electrolytic cell containing an electrolyte solution of (B^{2+}) ions (under suitable conditions)

(a) Metal (C) is oxidized during the purification process.
(b) Metal (C) is reduced during the purification process.
(c) Metal (A) is oxidized at the anode and (C) is deposited at the anode.
(d) Metal (A) is reduced at the anode and (C) is deposited at the cathode.

7- When plating a jug with a layer of silver its mass 26.25 g by passing an electric current of 25 amperes through an electrolyte containing silver ions, which of the following is the time required to complete this process?
(Ag = 108 g/mol)

(a) 14.2 minutes
(b) 15.2 minutes
(c) 15.6 minutes
(d) 13.2 minutes

8- The following figure shows two galvanic cells:



-Which of the following is correct for the electrodes (A,B,C)?

(a) (A) is the strongest reducing agent
(b) (C) has the lowest oxidation potential
(c) (B) is the least active electrode
(d) (C) electrode mass increases

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

9- A galvanic cell is formed from electrodes (X) and (Y), Electrons were transferring toward electrode Y during operating, Which of the following is correct?

a) Reduction potential of (X) is less than the reduction potential of (Y)

b) Oxidation potential of (X) is less than the oxidation potential of (Y)

c) Electrode (X) is the positive electrode of the cell.

d) Anions flow across the bridge towards electrode (Y)

10- The standard potentials of electrodes (X) and (Y) are as follows:

$X_{(s)} + 2H^+_{(1M)} \rightarrow X^{2}_{(aq)} + H_{2(g)}$, $E^\circ = +0.76$ V

$Y_{(s)} + 3H^+_{(1M)} \rightarrow Y^{3+}_{(aq)} + 3/2H_{2(g)}$, $E^\circ = +1.66$ V

-Which of the following is correct for an electrochemical cell formed from (X) and (Y)?

a) The anode is X and the emf value is +0.9 V

b) The anode is Y and the emf value is +0.9 V

c) The anode is X and the emf value is +2.42 V

d) The anode is Y and the emf value is +2.42 V

11- When an electric current is passed through a copper (II) nitrate solution using a pure copper electrode connected to the positive pole of battery and an iron electrode connected to the negative pole of the battery.

-Which of the following is true when the electric current is passed?

a) The concentration of nitrate ions in the solution increases while the concentration of copper ions remains constant.

b) Copper ions are reduced at the cathode, and the solution remains electrically neutral.

c) The concentration of copper ions increases while the concentration of nitrate ions in the solution decreases.

d) The copper at the anode is oxidized, and the total charge of the solution becomes positive.

12- Three electrolytic cells are connected in series, each containing inert electrodes and the following electrolytes: molten Al_2O_3, molten Mg_3N_2, and molten NaCl. Which of the following represents the ratio between the volumes of gases emitted from these cells?

	Oxygen gas	Nitrogen gas	Chlorine gas
a)	2	3	1
b)	0.166	0.250	0.330
c)	1	2	3
d)	0.250	0.166	0.500

13- The following reaction occurs in a galvanic half-cell: $X^{n+} + ne^- \rightarrow X$

Which of the following represents element (X) and the use of this cell?

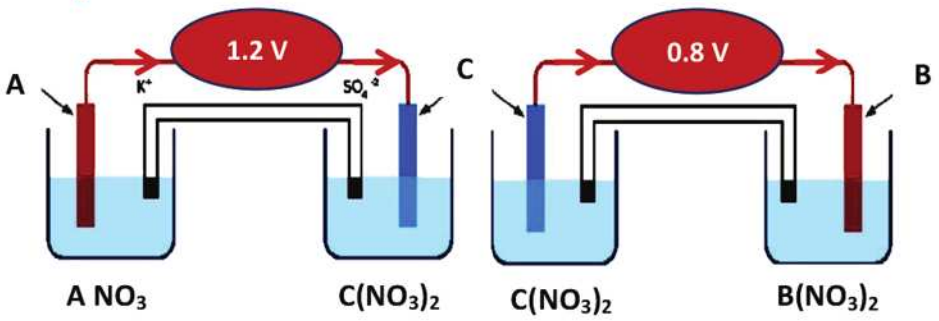
	Element (X)	Use of the cell
a)	Hg	Ear phones
b)	Pb	medical devices
c)	H_2	drinking water for astronauts
d)	O_2	spacecraft

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

14- Which of the following is correct during the discharge of a lithium ion cell?

a) Lithium ions move from positive electrode to negative electrode.
b) Electrons move from positive electrode to negative electrode.
c) Lithium ions move to the negative electrode.
d) Lithium ions move to the positive electrode.

15- From the electrolytic cells shown:



-Which of the following represents a cell consisting of two electrodes: (B) as anode and (A) as cathode?

a) A spontaneous reaction occurs, emf = +2 V
b) A non-spontaneous reaction occurs, emf = -1.2 V
c) A non-spontaneous reaction occurs, emf = -2 V
d) A spontaneous reaction occurs, emf = +1.2 V

16- When a galvanic cell is formed from electrodes (Y) and (X), an increase in the concentration of (Y^{2+}) ions is observed.

-Which of the following statements is correct?

(a) The oxidation potential of (X) is greater than that of (Y).
(b) (Y^{2+}) is a reducing agent during cell operation
(c) Electrons flow in the wire from (X) to (Y)
(d) (X^{2+}) is an oxidizing agent during cell operation

17- By using the following table:

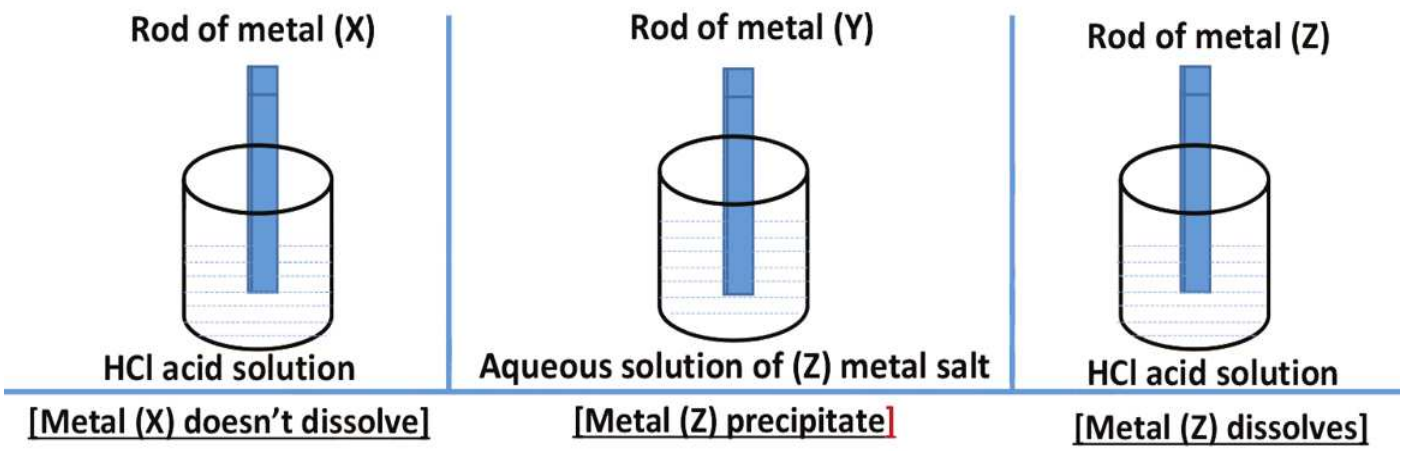
Type of reaction	Reaction equation
Non-spontaneous	$Cd + Zn^{2+} \rightarrow Cd^{2+} + Zn$
Spontaneous	$Cd + Cu^{2+} \rightarrow Cd^{2+} + Cu$

- Which of the following expresses the correct order of the above metal ions according to their strength as oxidizing agents?

(a) $Cd^{2+} > Cu^{2+} > Zn^{2+}$
(b) $Zn^{2+} > Cu^{2+} > Cd^{2+}$
(C) $Cd^{2+} > Zn^{2+} > Cu^{2+}$
(d) $Cu^{2+} > Cd^{2+} > Zn^{2+}$

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

18- From the following figure:



-Which of the following expresses the poles that form a galvanic cell with the greatest electromotive force?

(A) X,Z
(B) Y, H_2
(C) X,Y
(D) Z,Y

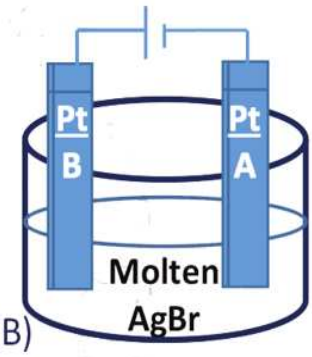
19- The following table shows four galvanic cells made of hypothetical metals with an iron electrode under standard conditions:

Electrodes	Cell potential	Direction of flow of electrons
A - Fe	+ 1.4 V	A → Fe
B - Fe	+ 1.05 V	Fe → B
C - Fe	+ 0.5 V	C → Fe
D - Fe	+ 1.7 V	Fe → D

-Which of the following metals is preferred to be used as a sacrificial electrode for iron to protect it from rust?

(a) A
(b) B
(c) C
(d) D

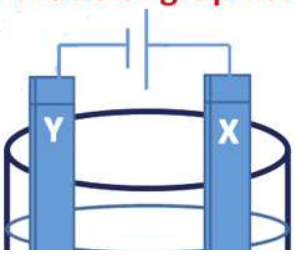
20- Which of the following occurs in the electrolytic cell In the corresponding figure?



(a) Reduction of bromide ions ($Br^-_{(aq)}$) at electrode (A)
(b) Oxidation of bromide ions ($Br^-_{(aq)}$) at electrode (B)
(c) Reduction of silver ions ($Ag^+_{(aq)}$) and precipitated at electrode (B)
(d) Oxidation of silver ions ($Ag^+_{(aq)}$) and precipitated at electrode (A)

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

21- In the cell shown in the figure, if the electrodes (Y) and (X) are made of graphite.
- Which of the following describes what happens in this cell?



(a) Electrode (Y) is coated with a layer of (X)
(b) The concentration of Cu^{2+} ions remains constant.
(c) The concentration of Cl^- ions remains constant.
(d) Cl_2 gas evolves at electrode (X)

22- An electric current of 10 amperes was passed through a sodium chloride melt for 10 hours.
- Which of the following expresses the mass of produced sodium metal? [Na=23]
(a) 42.1 g
(b) 423.2 g
(c) 85.8 g
(d) 21.1 g

23- Which of the following reactions could represent a spontaneous reaction within an electrochemical cell?
(a) $Cu_{(s)} + Zn^{2+}_{(aq)} \rightarrow Cu^{2+}_{(aq)} + Zn_{(s)}$
(b) $Mg_{(s)} + Zn^{2+}_{(aq)} \rightarrow Mg^{2+}_{(aq)} + Zn_{(s)}$
(C) $2Ag_{(s)} + Cu^{2+}_{(aq)} \rightarrow 2Ag^{+}_{(aq)} + Cu_{(s)}$
(d) $3Cu_{(s)} + 2Al^{3+}_{(aq)} \rightarrow 3Cu^{2+}_{(aq)} + 2Al_{(s)}$

24- A cell consisting of two electrodes (X) and (Y), where:
$E°(X^{3+}/X) = -1.670$ V
$E°(Y^{2+}/Y) = +0.34$ V
-Which of the following expresses the number of cells consisting of these two electrodes that must be connected in series to obtain a battery with an emf of 8.05 V and the role of each electrode in the cell?
(a) 4 cells, with (Y) as the anode and (X) as the cathode
(b) 6 cells, with (Y) as the anode and (X) as the cathode
(c) 4 cells, with (X) as the anode and (Y) as the cathode
(d) 6 cells, with (X) as the anode and (Y) as the cathode

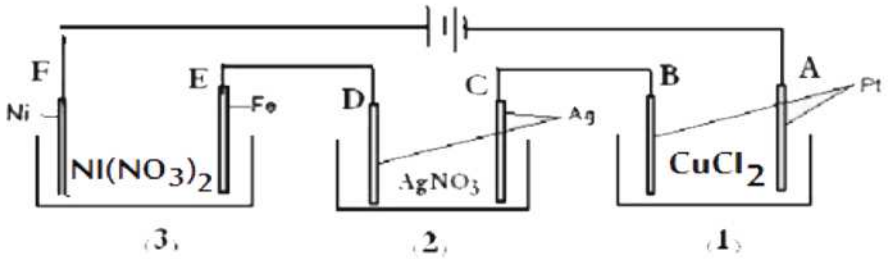
25- The following table represents electrical potentials of four metals (X, Y, Z, W):

W	Z	Y	X
$W/W^{2+} = -1.42$ V	$Z^{2+}/Z = -2.375$ V	$Y/Y^{2+} = -1.2$ V	$X^{2+}/X = 0.34$ V

-Which of the metals is the fastest to corrode when it is in contact with zinc?
[$Zn \rightarrow Zn^{2+} + 2e^-$, $E^0 = 0.76$V]
(a) X (b) Y
(c) Z (d) W

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

26- The following figure shows three cells connected in series:



(Ni=58.7g/mol, Ag=108g/mol, Cu=63.5g/mol)

When an electric current passes through the circuit for a quarter of an hour, which electrode increases in mass at the greatest rate?

(a) A (b) C (c) D (d) E

27- Which of the following represents an oxidation-reduction reaction can be used to obtain electrical energy?

(a) Conversion of lead sulphate into Lead (IV) ions in car battery

(b) Coating parts of cars with (Cr) electrically metal to protect them from rust

(c) Analysis of water into hydrogen and oxygen by electricity.

(d) Combination of hydrogen with oxygen to form water.

28- Which of the following occurs in a lead-acid battery during charging?

(a) Pb^{2+} ions are converted to Pb^{4+} ions at the cathode.

(b) Pb^{2+} ions are converted to Pb ions at the anode.

(c) Electrons are transferred from the (-ve) electrode to (+ve) electrode.

(d) Electrons are transferred from the anode to the cathode.

29- The following reaction occurs in an electrochemical cell:

$$2M_{(s)} + 3Zn^{2+}_{(aq)} \rightarrow 2M^{3+}_{(aq)} + 3Zn_{(s)} \quad , E^{\circ}_{cell} = +1\ V$$

If you know that: $Zn^{2+}_{(aq)} \rightarrow Zn_{(s)}$, $E^{\circ} = -0.76\ V$

- Which of the following expresses the type of electrode (M) and its oxidation potential, as well as the type of cell?

(a) Electrode (M) is an anode and its oxidation potential = +1.76 and the cell is galvanic

(b) Electrode M is an anode and its oxidation potential is = +0.24 and the cell is electrolytic

(c) Electrode M is a cathode and its oxidation potential is = -0.24 and the cell is electrolytic

(d) Electrode M is a cathode and its oxidation potential is = -1.76 and the cell is galvanic

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

26- A galvanic cell consists of:

An electrode (X) in XSO_4 solution

An electrode (Y) in YSO_4 solution

-If metal (X) is a stronger reducing agent than metal (Y), which of the following describes what happens in this cell?

a) Electrons move from (Y) to (X) through the external wire

b) The mass of electrode (X) increases by time

c) Negative ions move from the bridge to the half cell (X)

d) Reduction of (X^{2+}) ions occurs at the anode

27- An electrochemical cell undergoes the following reaction:

$$2Y_{(s)} + 3X^{+}_{(aq)} \rightarrow 2Y^{+}_{(aq)} + 3X_{(s)};\ emf = +1.6\ V$$

- Which of the following is correct for both electrode type (Y) and cell type?

	the Y-electrode type	type of cell
A	cathode	Galvanic
B	anode	Electrolytic
C	anode	Galvanic
d	cathode	Electrolytic

28- Four electrodes [X], [Y], [Z], [L], where:

(X^{2+}/X)	(Y^{2+}/Y)	(Z/Z^{2+})	(L/L^{2+})
-0.44 V	+1.5 V	-0.34 V	+1.18 V

Which of the following reactions represents a cell that produces the greatest electromotive force (emf)?

a) $Y + L^{2+} \rightarrow Y^{2+} + L$

b) $X + L^{2+} \rightarrow X^{2+} + L$

c) $L + Y^{2+} \rightarrow L^{2+} + Y$

d) $X + Y^{2+} \rightarrow X^{2+} + Y$

29- Which of the following examples illustrates cathodic protection of metals against corrosion?

(a) Coating iron with an inorganic substance such as red primer

(b) Galvanizing iron by dipping it in zinc

(c) Coating iron with a metal that has a lower reduction potential than iron

(d) Coating iron with a metal that has a lower oxidation potential than iron

30- Which of the following represents the anode half-reaction during the electrolysis of molten sodium hydride (NaH) between graphite electrodes?

a) $2Na^{+} + 2e^{-} \rightarrow 2Na$

b) $2Na \rightarrow 2Na^{+} + 2e^{-}$

c) $2H_2 \rightarrow 2H^{+} + 2e^{-}$

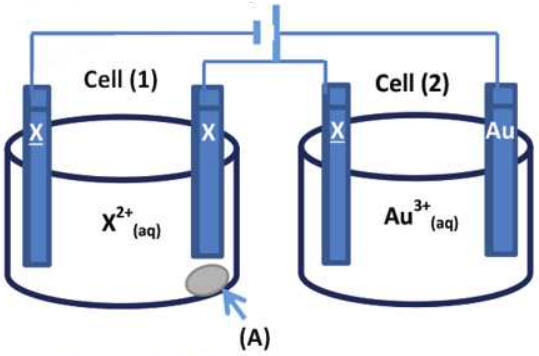
d) $2H^{-} \rightarrow H_2 + 2e^{-}$

31- Which of the following metals that deposits 18 g when 1.5 F passes through one of its molten salts? (Na = 23, Mg = 24, Ca = 40, K = 39)

a) Na b) Mg c) Ca d) K

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

32- From the opposite figure:



All of the following are correct for cells (1) and (2) except:

a) Cells (2) is used to plate metal (X)
b) Cell (1) is used to purify metal (X)
c) The potential of battery is slightly greater than That of metal (X)
d) The oxidation potential of substance (A) is higher than that of (X)

33- In Daniell cell, if the mass of consumed zinc is 6.5 g, then the mass of deposited copper is: (Zn = 65, Cu = 63.5)

a) 6.5 g, deposited at the positive electrode
b) 6.35 g, deposited at the anode half-cell
c) 6.35 g, deposited at the positive electrode
d) 3.25 g , deposited at the cathode half-cell

34- The reaction that occurs inside an electrochemical cell: -

$$3Cu^{2+} + 2Cr \rightarrow 3Cu + 2Cr^{3+}$$

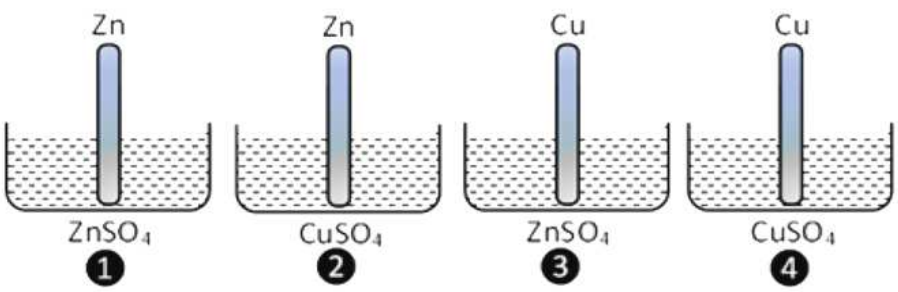
-knowing that: $Cu^{2+} + 2e^- \rightarrow Cu$, $E^o = +0.340$ V

$Cr \rightarrow Cr^{3+} + 3e^-$, $E^o = +0.740$ V

- Which of the following expresses the type of the cell and its emf value?

(a) Galvanic cell, (+1.08 V) = emf
(b) Electrolytic cell, (-1.08 V) = emf
(c) Galvanic cell, (+0.4 V) = emf
(d) Electrolytic cell,(-0.4 V) = emf

35- From the following shapes:



Which of the following is correct?

(a) When (1) is connected to (4) with a salt bridge and an external connecting wire, (4) Becomes the anode and (1) becomes the cathode.
(b) A spontaneous reaction occurs in (2) and the concentration of copper ions increases.
(c) When (1) is connected to (4) with a salt bridge and a connecting wire, electrons Spontaneously transfer from (1) to (4).
(d) A spontaneous reaction occurs in vessel (3), and the concentration of Zinc ions Decreases.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

36- Two galvanic cells:

The first cell: electrode (X) is the anode, and the hydrogen electrode is the cathode, Giving an emf value of (+0.23) V.

The second cell: electrode (Y) is the cathode and the hydrogen electrode is the anode, Giving an emf value of (+0.8) V.

- Which of the following expresses the cell composed of electrodes (X) and (Y)?

(a) (X) is the anode and (Y) is the cathode, emf = 1.03 V

(b) (X) is the anode and(Y) is the cathode, emf = 0.57 V

(c) (Y) is the anode and (X) is the cathode, emf = 1.03 V

(d) (Y) is the anode and (X) is the cathode, emf = 0.57 V

37- The following table shows the oxidation potential of some hypothetical elements:

The element	X	Y	Z	W
Oxidation potential	+ 0.126 V	-0.401 V	-1.420 V	+1.67 V

Which of the following represents the correct protection?

(a) (X) Anodic protection for (W)

(b) (Z) Anodic protection for (Y)

(c) (W) Cathodic protection for (Y)

(d) (Y) Cathodic protection for (X)

38- Which of the following expresses the reaction that occurs at the anode of an electrolytic cell for molten potassium bromide?

(a) $2K^+ + 2e^- \rightarrow 2K^0$

(b) $2Br^- \rightarrow Br_2 + 2e^-$

(c) $2K^+ \rightarrow 2K^0 - 2e^-$

(d) $Br_2 + 2e^- \rightarrow 2Br^-$

39- Which of the following is correct for negative hydroxide ions in a fuel cell?

(a) Consumed as a result of the reduction reaction and formed as a result of the Oxidation reaction.

(b) Consumed as a result of the oxidation reaction and formed as a result of the Reduction reaction.

(c) Its concentration decreases at cathode

(d) Its concentration increases at anode

40- The amount of electricity required to precipitate (1 mol) of Au^{3+} can precipitate (1.5 mol) of:

(a) Na^+

(b) Mg^{2+}

(c) Cu^+

(d) Al^{3+}

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

41- Permanganate ions MnO_4^- can be prepared by electrolysis of a solution containing manganese ions Mn^{2+} according to the following reaction:

$$Mn^{2+} + 4\,H_2O \rightarrow MnO_4^- + 8H^+ + 5e^-$$

- The amount of electricity required to prepare 0.2 mol of permanganate ions is equal to:

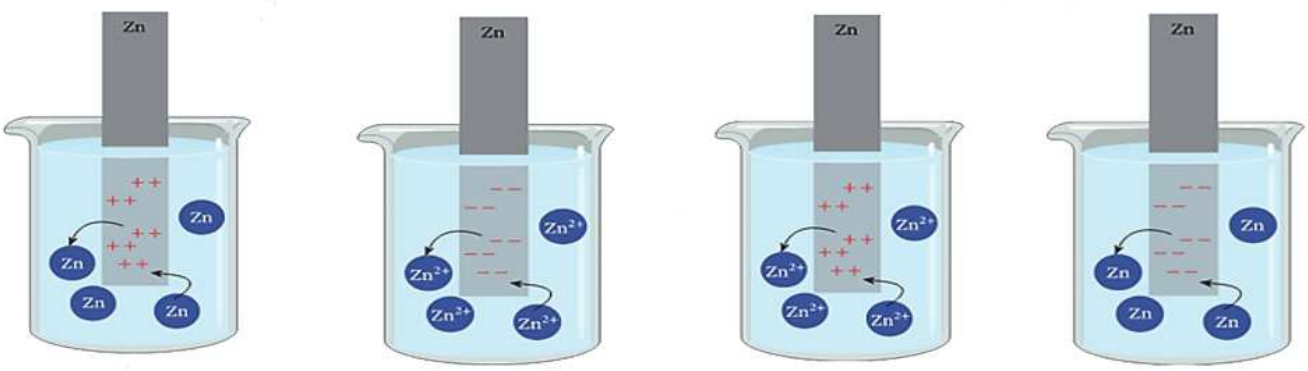
a) 48250 C
b) 193000 C
c) 19300 C
d) 96500 C

42- Which of the following represents the reactions at the electrodes of an Electrolytic cell for a copper chloride solution using platinum electrodes?

	Reaction at the anode	Reaction at the cathode
a)	$Cu \rightarrow Cu^{+2} + 2e^-$	$Cl_2 + 2e^- \rightarrow 2Cl^-$
b)	$2Cl^- \rightarrow Cl_2 + 2e^-$	$Cu^{+2} + 2e^- \rightarrow Cu$
c)	$Cu^{+2} + 2e^- \rightarrow Cu$	$Cl_2 + 2e^- \rightarrow 2Cl^-$
d)	$Cl_2 + 2e^- \rightarrow 2Cl^-$	$Cu \rightarrow Cu^{+2} + 2e^-$

43- A zinc rod is placed in a container containing a molar solution of its ions at a temperature of 25°C.

-Which of the following diagrams represents the equilibrium state between the oxidation reactions of zinc atoms and the reduction reactions of zinc ions in the container?



(a) (b) (c) (d)

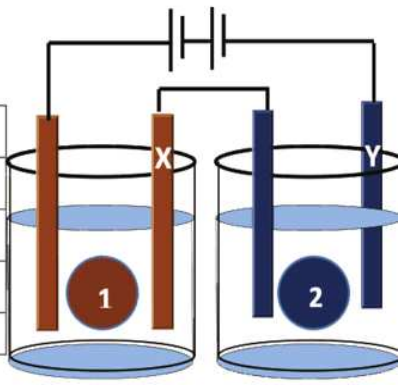
44- When a car battery (X) with an acid density of 1.19 g/cm^3 is connected in series With another car battery (Y) with an acid density of 1.29 g/cm^3 which of the Following occurs?

a) Pb^{2+} ions are oxidized to Pb^{4+} ions at the positive electrode of the battery (X), and lead atoms are oxidized to Pb^{2+} ions at the positive electrode of the battery (Y).
b) Pb^{2+} ions are reduced to Pb atoms at the positive electrode of the battery (X), and Pb^{2+} ions are reduced to Pb atoms at the positive electrode of the battery (Y).
c) Pb^{2+} ions are oxidized to Pb^{4+} ions at the negative electrode of the battery (X), and lead atoms are oxidized to Pb^{2+} ions at the positive electrode of the battery (Y).
d) Pb^{2+} ions are reduced to Pb atoms at the negative electrode of the battery (X), and Pb^{4+} ions are reduced to Pb^{2+} ions at the positive electrode of the battery (Y).

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

45- The following figure shows two cells containing molten of different salts. After an electric current was passed through the cells for a period of time, the increase in cathode mass of cell 1 is twice that of the cathode of cell 2
Which of the following represents the molten salts in the two cells? And the substance formed at (X, Y) electrodes?

(Cu = 63.5, Al = 27, Au = 195, Mg = 24, Zn = 65, Cr = 52)



	Cell (1)-formed substance at (X)	Cell (2)- formed substance at (Y)
a)	$AuCl_3$- gold is precipitated	$ZnCl_2$-Chlorine gas is evolved
b)	$AuCl_3$- gold is precipitated	$ZnCl_2$- zinc is precipitated
c)	$CrCl_3$-Chlorine gas is evolved	$AlCl_3$-Chlorine gas is evolved
d)	$CrCl_3$-Chromium is precipitated	$MgCl_2$-Chlorine gas is evolved

46- A galvanic cell consists iron and tin electrodes:

$$Fe^0_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^-,\ E^0 = +0.409\ V$$
$$Sn^{2+}_{(aq)} + 2e^- \rightarrow Sn^0_{(s)},\ E^0 = +0.150\ V$$

Which of the following represents the anode or the cathode, and what is the emf value of the cell?

a) Iron electrode is anode and emf = +0.559 V
b) Iron electrode is cathode and emf = -0.559 V
c) Tin electrode is anode and emf = +0.259 V
d) Tin electrode is cathode and emf = -0.259 V

47- The following reaction represents an electrochemical cell:

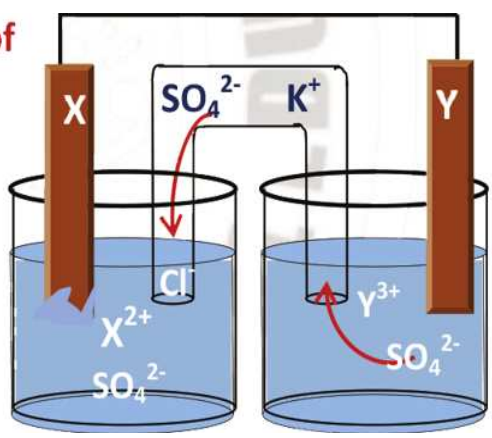
$$X^o_{(s)} + 2Y^+_{(aq)} \rightarrow X^{2+}_{(aq)} + 2Y^o_{(s)}$$

Given that: $X^o_{(s)} \rightarrow X^{2+}_{(aq)} + 2e^-,\ E^o = +0.23\ V$
$2Y^+_{(s)} + 2e^- \rightarrow 2Y^o_{(aq)},\ E^o = +0.8\ V$

Which of the following represents the type of this cell and the value of emf?

(a) Electrolytic and emf = -1.03 V
(b) Galvanic and emf = -0.564 V
(c) Electrolytic and emf = +0.564 V
(d) Galvanic and emf = +1.03 V

48- The figure opposite shows a galvanic cell consisting of two electrodes. (X, Y):
-Which of the following represents the total reaction of the cell?



a) $X_{(s)} + Y^{3+}_{(aq)} \rightarrow X^{2+}_{(aq)} + Y_{(s)}$
b) $Y_{(s)} + X^{2+}_{(aq)} \rightarrow Y^{3+}_{(aq)} + X_{(s)}$
c) $2X_{(s)} + 3Y^{3+}_{(aq)} \rightarrow 2X^{2+}_{(aq)} + 3Y_{(s)}$
d) $3X_{(s)} + 2Y^{3+}_{(aq)} \rightarrow 3X^{2+}_{(aq)} + 2Y_{(s)}$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

49- Which of the following reactions represents a non-spontaneous reaction that occurs at the anode of an electrolytic cell?

a) $Br_2 + 2e^- \rightarrow 2Br^-$

b) $Cu^{2+}_{(aq)} \rightarrow Cu_{(s)} - 2e^-$

c) $4OH^-_{(aq)} \rightarrow O_{2(g)} + 2H_2O_{(l)} + 4e^-$

d) $2H_2O_{(l)} + 2e^- \rightarrow H_{2(g)} + 4OH^-_{(aq)}$

50- A galvanic cell (X) consists of two electrodes (A, B), and electrons flow through the external wire from (B) to (A).
-An electrochemical cell (Y) consisting of the same electrodes undergoes the following reaction: $A_{(s)} + B^{2+}_{(aq)} \rightarrow A^{2+}_{(aq)} + B_{(s)}$
-Which of the following options describes cell (Y)?

(a) Galvanic with positive (emf) , electrode (A) is negative and acts as an anode
(b) Galvanic with a positive (emf) , electrode (B) is positive and acts as a cathode
(c) Electrolytic with a negative (emf) , electrode (A) is negative and acts as an anode
(d) Electrolytic with a negative (emf) , electrode (B) is negative and acts as a cathode

51- The opposite diagram shows a water tank connected to a pipe and tap made of three metals (X, Y, Z), with reduction potentials as follows: (X = -0.40 V, Y = +0.3 V, Z = -2.71 V). The pipe acts as a scarifying electrode for both the tank and the tap, and the material of the tap provides cathodic protection for the tank under normal conditions.
-Which of the following represents the metals from which each is

	Tank	Tap	Pipe
a)	Y	X	Z
b)	X	Y	Z
c)	X	Z	Y
d)	Z	Y	X

52- A copper rod containing iron and silver impurities was purified using electrolysis.
-Which of the following represents the change in electrode masses after a period of time of the passage of electric current?

a) The decrease in anode mass equals the increase in cathode mass.
b) The decrease in anode mass is less than the increase in cathode mass.
c) The decrease in anode mass is greater than the increase in cathode mass.
d) The decrease in anode mass equals the mass of the undissolved impurities.

53- Which of the following is correct for both a fuel cell and a mercury cell?

a) Both are cells that convert stored chemical energy into electrical energy.
b) Reduction occurs in both at the negative electrode.
c) The components of both cells are consumed during operation.
d) Both are alkaline cells, and the electrolyte concentration does not change during operation.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

54- A metal is connected to the cathode of an electrolytic cell for plating with chromium metal using an acidic electrolyte solution containing $Cr_2O_7^{2-}$ ions.
(If you know that oxygen gas is released at the anode of this cell)
-Which of the following represents the number of moles of gas released when the mass of the metal to be plated is increased by 151g? [Cr=52, O=16]

a) 4.36
b) 0.726
c) 17.4
d) 3.86

55- The following table shows the standard electrical potentials of four elements:

The element	$A^{2+} + 2e^- \rightarrow A$	$B \rightarrow B^{2+} + 2e^-$	$C^{2+} + 2e^- \rightarrow C$	$D \rightarrow D^{2+} + 2e^-$
E^o	-2.71 V	+0.40 V	+0.80 V	-1.20 V

Which of the following represents the number of galvanic cells that can be formed from these elements, and the highest value of emf that can be obtained?

a) 4 cells, emf = 1.60 V
b) 6 cells, emf = 3.91 V
c) 6 cells, emf = 3.11 V
d) 12 cells, emf = 3.51 V

56- The following equilibrium reaction occurs in a closed container:

$C_{(s)} + CO_{2(g)} \rightleftharpoons 2CO_{(g)}$, $\Delta H = +127$ kJ/mol

Which of the following changes increases the amount of carbon monoxide gas without affecting the Kc value of the reaction?

a) Increasing the temperature of the system
b) Adding extra amount of carbon
c) Decreasing the volume of the reaction vessel
d) Increasing the volume of the reaction vessel

57- The following reactions are non-spontaneous:

$Z_{(s)} + Y^{+2}_{(aq)} \rightarrow Z^{+2}_{(aq)} + Y_{(s)}$

$Y_{(s)} + X^{+2}_{(aq.)} \rightarrow Y^{+2}_{(aq)} + X_{(s)}$

Which of the following is true for the following reaction:

$$X_{(s)} + Z^{+2}_{(aq.)} \rightarrow X^{+2}_{(aq.)} + Z_{(s)}$$

a) Spontaneously and (X) is a reducing agent.
b) Non-spontaneous and (Z) is a reducing agent.
c) Non-spontaneous and (X) is an oxidizing agent.
d) Spontaneously and (Z^{2+}) is a reducing agent.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

58- During the recharging of a lithium-ion battery.
Which of the following is correct?

a) The mass of the cathode increases and the concentration of lithium ions in the Electrolyte decreases.

b) The mass of the anode increases and the concentration of lithium ions in the Electrolyte increases.

c) The mass of the cathode decreases and (Co^{4+})ions are reduced to (Co^{3+}).

d) The mass of the anode decreases and (Co^{3+}) ions are oxidized to (Co^{4+}).

59- When (9650) coulombs are passed through molten copper compound, (0.1) mol of copper is deposited at one electrode and (0.05) mol of gas is released at the other electrode. Which of the following represents the reactions occurring at both the anode and cathode of the cell?

	Cathode Reaction	Anode Reaction
a)	$4Cu^{+}_{(l)} + 4e^{-} \rightarrow 4Cu_{(s)}$	$2O^{2-}_{(l)} \rightarrow O_{2(g)} + 4e^{-}$
b)	$2Cu^{2+}_{(l)} + 2e^{-} \rightarrow Cu_{(s)}$	$2Cl^{-}_{(l)} \rightarrow Cl_{2(g)} + 2e^{-}$
c)	$2Cu^{+}_{(l)} + 2e^{-} \rightarrow 2Cu_{(s)}$	$2Cl^{-}_{(l)} \rightarrow Cl_{2(g)} + 2e^{-}$
d)	$4Cu^{2+}_{(l)} + 4e^{-} \rightarrow 2Cu_{(s)}$	$2O^{2-}_{(l)} \rightarrow O_{2(g)} + 4e^{-}$

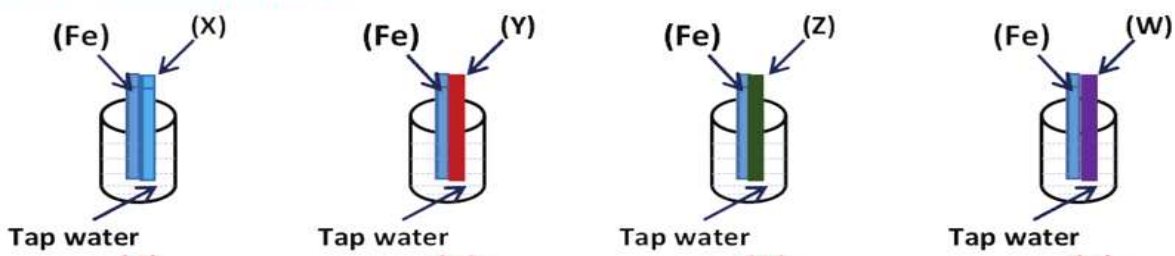
60- Three metals (X, Y and Z)
X: A solution of its salt cannot be stored in a container made of metal (Z).
Y: A solution of its salt can be stored in a container made of metal (Z).
- Which of the following expresses the correct order of metals (X, Y, Z) according to their oxidation potentials?

a) Y < X < Z b) X < Z < Y
c) Z < X < Y d) X < Y < Z

61- Which of the following describes what happens when calcium chloride is used in The salt bridge of a Daniel cell?

(a) The concentration zinc ions at the anode decreases
(b) The cell stops operating after a very short time
(c) The concentration of copper ions at the anode increases
(d) The cell continues to produce an electric current

62- From the following figures:

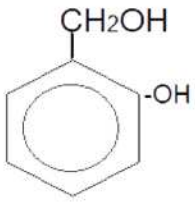


"Given that the oxidation potentials of the metals (X, Y, Z and W) are (+0.12 V, +0.74 V, -0.4 V, +1.27 V) respectively, and the oxidation potential of iron is (+0.44 V)"
- Which of the following shows the correct order of the tube in which iron corrodes, Based on the rate of corrosion?

(a) (4) < (2) (b) (2) < (4)
(c) (1) < (3) (d) (3) < (1)

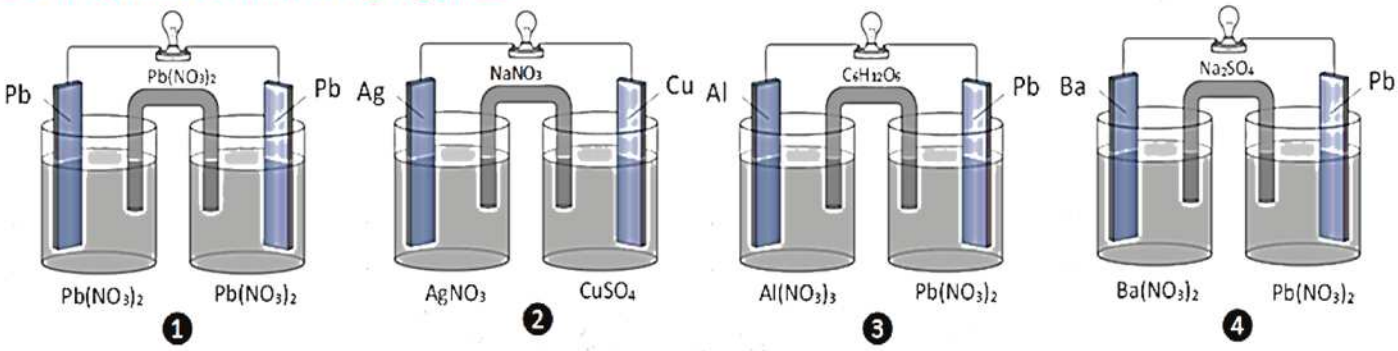
موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

63- Which of the following represents the compound produced from the oxidation of the opposite compound?



(a) It reacts with Na and does not react with Na_2CO_3
(b) It reacts with NaOH and with HCl
(c) It reacts with NaOH and reacts with Na_2CO_3
(d) It reacts with Na_2CO_3 , and with HCl

64- From the following figures:



-Which of the following is true?

(a) Only cells 1 and 2 produce an electric current under standard conditions
(b) Cell 2 does not produce an electric current because both Cu and Ag have negative Oxidation potentials
(C) Cells 3 and 4 do not produce an electric current because of the electrolyte in The salt bridge
(D) Cells 1 and 4 produce an electric current when $NaNO_3$ is used as the electrolyte Under standard conditions

65- Copper (II) sulfate solution with a concentration of (0.2 M) and a volume of (600 mL) , electric current with intensity (96.5A) is passed through it.

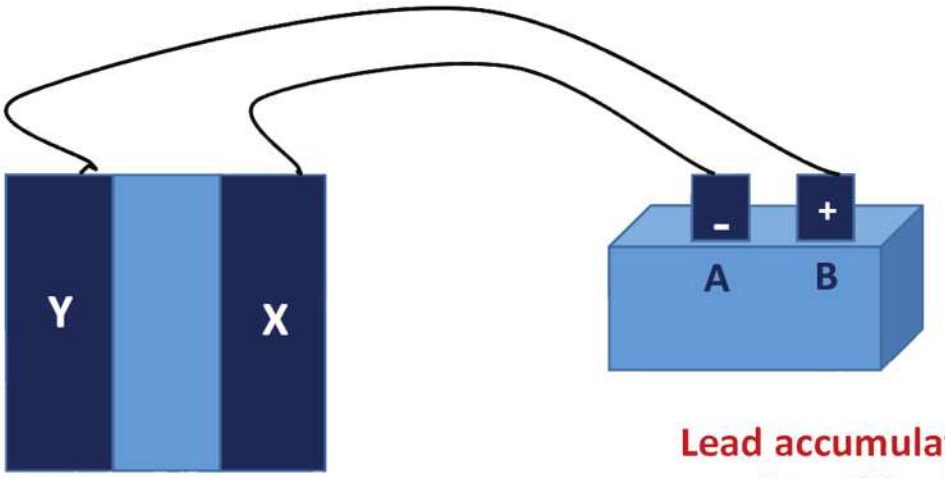
-The time required for reduction and complete deposition of copper cations on the cathode is:

a) 180 sec b) 180 min c) 240 sec d) 240 min

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

Essay questions:

45- Study the following figure:



Li^+ Cell

Lead accumulator consists of 2 cells

Answer the following questions

(a) Identify the anode and cathode in a lithium battery.

(b) Identify (lead battery or lithium cell) where spontaneous reactions occur.

46- From the following diagram:

-If you know that organic compound (A) is used as a preservative for frozen fruit, and organic compound (F) is produced by the catalytic hydration of propyne.

(1) Write the structural formulas for compounds (B) and (D).

(2) Write the names of chemical processes (C) and (E).

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

الوحدة الخامسة

1- (A, B, C) Three hydrocarbons:

(A): gas and one of the components of oven gas by smaller ratio in hot countries.

(B): Contains the same number of carbon atoms as compound (A), but its Molecular formula is two atoms less than that of compound (A).

(C): Unsaturated, its molecular formula two less hydrogen atoms than Compound (B).

-Which of the following represents the products of complete hydrogenation in the presence of a catalyst for each of the above compounds?

	Product of hydrogenation (A)	Product of hydrogenation (B)	Product of hydrogenation (C)
A	Propane	Propane	Propane
B	Butane	Propane	Propene
C	Butane	Cyclopropane	Propyne
d	Propane	Propene	Propyne

2- Three organic compounds (A), (B), and (C), each containing two carbon atoms

Compound (A): saturated hydrocarbon, can be liquefied by pressure and cooling

Compound (B): characterized by the presence of one hydrogen bond between Each two molecules

Compound (C): characterized by two hydrogen bonds between each pair of Molecules

- Which of the following represents the correct order of chemical processes required to obtain a saturated hydrocarbon with a boiling point lower than that of compound (A)?

(a) Halogenation of (A) - alkaline hydrolysis – neutralization-dry distillation

(b) Complete oxidation of (B)- addition of sodium hydroxide- dry distillation

(c) Reduction of (C) - dehydration - catalytic hydrogenation

(d) Reaction of (B) and (C) - hydrolysis in an acidic medium - oxidation of the product

3- Monobasic carboxylic acid (containing a number of carboxyl groups equal to the number of carbon atoms) added to alcohol has a freezing point of -110.5°C.

-Which of the following expresses the number of isomers of the resulting compound that have the same functional group group?

(a) 0

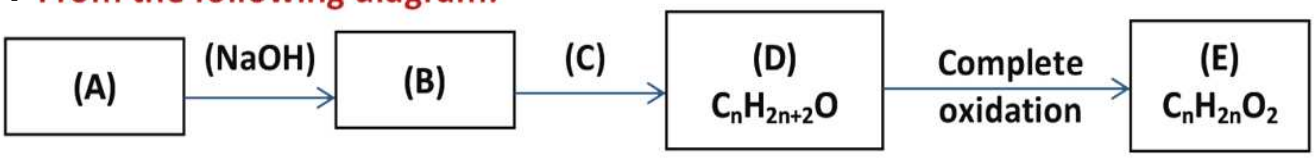
(b) 1

(c) 2

(d) 3

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

4-From the following diagram:



If you know that organic acid (A) causes muscle contraction when its level in the body increases.

-Which of the following expresses the correct name for each of (D) and (E) and the name of the process (C)?

(A) D: Propanol, E: Propanoic acid , C: Dry distillation

(b) D: ethanol , E: Ethanoic acid , C: dehydration

(c) D: ethanol , E: Ethanoic acid , C: dry distillation

(d) D: propanol, E: propanoic acid, C: dehydration

5- Which of the following expresses the correct order of chemical processes necessary to obtain an organic compound used as antifreeze from cane sugar?

(a)Hydrolysis – alcoholic fermentation – dehydration/140°C – addition of Hydrogen peroxide

(b) Alcoholic fermentation – hydrolysis – dehydration/180°C – Bayer reaction

(c) Hydrolysis – alcoholic fermentation – dehydration/180°C – addition of Hydrogen peroxide

(d) Hydrolysis – alcoholic fermentation – dehydration/80°C – addition of Hydrogen peroxide

6- Three organic acids that do not contain a carboxyl group:

(A): A weak solid acid with a characteristic odor at room temperature

(B): Can be prepared by reacting benzene with a mineral acid by substitution

(C): Used as an antiseptic in treatment of burns

-Which of the following describes the above acids?

(a) Acid (A) can be prepared from acid (B) by complete oxidation in the presence Of a dehydrating agent.

(b) Acid (B) can be prepared from acid (A) by adding concentrated nitric acid in The presence of sulphuric acid.

(c) Acid (C) can be prepared from acid (B) by adding concentrated nitric acid and Sulfuric acid

(d) Acid (B) can be prepared from acid (A) by adding zinc and heating, then Adding concentrated sulphuric acid

7- Which of the following compounds burns in an abundance of oxygen to produce 3 mol of water vapor and 3 mol of carbon dioxide?

(a) Propane (b) Cyclopropane (c) Propanol (d) Propane

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

8- Which of the following correctly describes the role of sodium hydroxide in preparation of Paraffins and the role of concentrated sulphuric acid in the preparation of olefins, respectively?

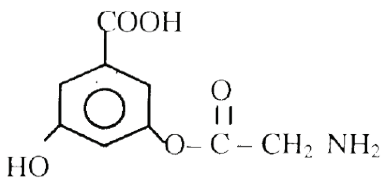
(a) Removing water from alcohols in the preparation of olefins and flux substance In the preparation of Paraffins

(b) Removing the carboxylate group in the preparation of olefins and removing Water in the preparation of Paraffins

(c) Removing the carboxylate group in the preparation of Paraffins and Illuminating water in the preparation of olefins

(d) Absorbing water vapor in the preparation of Paraffins and neutralizing acid Vapors in the preparation of olefins

9-Study the following compound:



Which of the following expresses the correct results when conducting the following experiments on this compound?

Exp. choices	1- Addition of sodium bicarbonate	2-Reduction with hydrogen then addition of iron III chloride solution	3-Hydrolysis in an acidic medium
A	effervescence occurs and a gas evolves, clouding the clear lime water	The solution turns purple	Benzoic acid is formed
B	No effervescence occurs	The solution turns purple	Acetic acid is formed
C	No effervescence occurs	The color does not change	Glycine is formed.
d	Effervescence occurs and a gas rises, clouding the clear lime water	The solution turns purple	Glycine is formed.

10-Which of the following expresses the correct order of chemical processes necessary to prepare a substance used in printing inks from the compound resulting from the catalytic hydration of the simplest alkyne?

(a) Reduction – esterification – Acidic hydrolysis– thermal cracking

(b) Oxidation – dry distillation – neutralization –passing water vapor

(c) Reduction – dehydration – hydrogenation – Halogenation

(d) Oxidation – neutralization – dry distillation – thermal cracking

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

11- Three organic compounds (A), (B), and (C) have the molecular formula $C_4H_8O_2$

(A): reacts with sodium hydroxide on cold.

(B): does not react with sodium hydroxide on cold.

(C): undergoes esterification and produces the simplest alcohol.

- Which of the following is correct?

(a) A: butyric acid , B: ethyl ethanoate

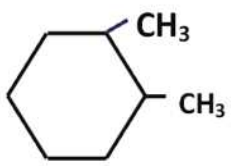
(b) C: Methyl propanoate , B: methyl propanoate

(c) A: 2-methyl propanoic acid , C: Ethyl ethanoate

(d) C: Methyl propanoate , B: Butanoic acid

12- The following processes were carried out on organic substance (X) in order (complete oxidation - neutralization - dry distillation - catalytic reforming - complete hydrogenation), and the corresponding compound was one of the products:

- Which of the following compounds could be substance (X)?



(a) 3, 4-dimethyl-1-heptanol

(b) 2, 3-dimethyl-1-hexanol

(c) 3, 4-dimethyl-1-hexanol

(d) 3, 5-dimethyl-1-heptanol

13- Which of the following expresses the correct order of chemical processes necessary to obtain an organic substance used as a food preservative and prevents the growth of fungi?

(a) Trimerization of acetylene - Halogenation in presence of a catalyst - Alkaline hydrolysis - reduction

(b) Catalytic reformation of hexane - alkylation - oxidation - neutralization

(c) Reduction of phenol - alkylation - oxidation - reduction

(d) Fractional distillation of coal tar - Halogenation in presence of a catalyst – Alkaline hydrolysis - alkylation

14- The general formula $C_4H_{10}O$ represents three alcoholic isomers (A), (B), and (C)

(A) : Contains two methyl groups.

(B) : Contains three methyl groups

(C) : Contains one methyl group.

- Which of the following expresses the correct IUPAC name for the product of adding acidified potassium permanganate to each of (A), (B), and (C)?

Choices	In case of (A)	In case of (B)	In case of (C)
A	2-butanone	2-methyl-2- propanoic	No reaction
B	2-methyl -2-propanoic	No reaction	2-butanone
C	No reaction	2-methyl -2-propanoic	2-butanone
d	2-methyl propanoic	No reaction	Butanoic acid

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

15-Which of the following alcohols oxidize with acidified potassium dichromate, and when dehydrated with concentrated sulfuric acid at 180°C, do not give 2-methyl-1-butene?

(a) 2,2- Dimethyl-2-butanol
(b) 2,2-Dimethyl-1-propanol
(c) 2-Methyl-2-propanol
(d) 2-Methyl-1-butanol

16- The following are general formulas for halogenated derivatives of some hydrocarbons and the uses of one of their isomers.
All of the following are true regarding the type of halogenated derivative and the use of one of its isomers except:

	formula of derivative	Type of derivative and use of one of its isomers
a)	$C_nH_nCl_{2n+1}$	Saturated: was used as an anesthetic
b)	$C_nH_{n+1}Cl_{n+1}$	Saturated: Used in dry cleaning
c)	$C_nH_{n+1}Cl_{n-1}$	Unsaturated: Used in carpet manufacturing
d)	$C_nH_{n-1}Cl$	Unsaturated: Used in the preparation of phenol

17- All of the following are true regarding the chemical formula and name according to the IUPAC system except:

	Chemical formula	name according to the IUPAC system
a)	$(CH_3)_3CC(CH_3)_3$	2,2,3,3-tetramethyl butane
b)	$(CH_3)_2CC(CH_3)_2$	3,2-dimethyl-2-butene
c)	$(CH_3)_3CC(C_2H_5)_3$	3,3-diethyl-2,2-dimethyl pentane
d)	$(CH_3)_3CCH_2C_2H$	4,4-dimethyl-2-butene

18- Which of the following represents the number of alkene isomers containing an ethyl group and with the molecular formula C_5H_{10}?

a) 6
b) 5
c) 4
d) 3

19- Which of the following is the IUPAC name of the alcohol produced by the alkaline hydrolysis of 2-bromo-3-methyl butane?

a) 2-Methyl-1-butanol
b) 3-Methyl-1-butanol
c) 2-Methyl-2-butanol
d) 3-Methyl-2-butanol

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

20- Two compounds (X, Y) have the following formulas:

X: $C_2H_5C_2H(CH_3)_2$ Y: $CH_3CHC(CH_3)_2$

Which of the following is the IUPAC name for the compounds formed by the addition of hydrogen bromide to compounds X and Y?

	Product of hydrogen bromide addition to compound (X)	Product of hydrogen bromide addition to compound (Y)
a)	2-Bromo-2-methyl pentane	2-Bromo-2-methyl butane
b)	2-Bromo-2-methyl pentane	2-Bromo-3-methyl pentane
c)	2-Bromo-4-methyl butane	1-Bromo-3-methyl butane
d)	2-Bromo-3-methyl butane	2-Bromo-2-methyl butane

21- Which of the following represents the correct order of the processes required to obtain the simplest aromatic carboxylic acid from the simplest aliphatic hydrocarbon?

a) Halogenation – Alkaline hydrolysis – Complete oxidation.

b) Strong heating and rapid cooling – Polymerization – Alkylation – Nitration.

c) Strong heating and rapid cooling – Polymerization – Alkylation – Oxidation.

d) Halogenation – Alkaline hydrolysis – Complete oxidation.

22- Which of the following processes is correct for obtaining a compound with the formula C_nH_nO from the compound $C_7H_6O_2$?

a) Basic hydrolysis b) Dehydration c) Acid hydrolysis d) Neutralization

23- Which of the following is the correct order of processes required to obtain 1,2-dimethyl cyclohexane from a compound with the molecular formula C_6H_6O?

a) Neutralization - Fractional distillation - Catalytic reforming - Reduction

b) Heating with zinc - Alkylation – Fridle Crafts reaction - Oxidation

c) Neutralization - Alkylation - Dehydration – Fridle Crafts reaction

d) Heating with zinc - Alkylation – Fridle Crafts reaction - Hydrogenation

24- Which of the following pairs of compounds can be used to produce a polymer (in only three chemical processes) used in the manufacture of arteries and heart valves?

a) Ethylene and para methyl toluene

b) Ethylene glycol and Terphthalic acid

c) Ethanol and para methyl toluene

d) Acetylene and ethanol

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

25- Given that:

Compound (A): An organic acid that reacts with oxygenated mineral acids and Does not react with halogenated acids.

Compound (B): An organic compound $C_nH_{2n}O$ and is oxidized to an acid used in The manufacture of insecticides and perfumes.

-Which of the following describes the use of the compound resulting from the reaction of (A) and (B) in an acidic or basic medium?

a) Explosives manufacturing
b) Electrical equipment
c) Disinfectant manufacturing
d) Heart valve manufacturing

26- All of the following can be used to distinguish between ethyl alcohol and phenol except:

a) Bromine water
b) Sodium
c) $FeCl_3$ solution
d) Acidified potassium permanganate

27- Three hydrocarbon derivatives:

Compound (1): reacts with dilute hydrochloric acid and does not react with Sodium hydroxide solution.

Compound (2): reacts with both compound (1) and sodium hydroxide solution Under suitable conditions.

Compound (3): reacts with sodium hydroxide solution and does not react with Hydrochloric acid.

All of the following are true except:

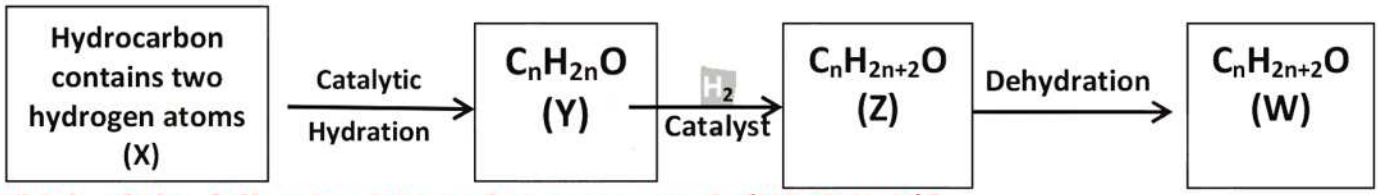
a) The general formula of compound (1) is $C_nH_{2n+2}O$
b) The general formula of compound (2) is $C_nH_{2n}O_2$
c) Iron (III) chloride is used for detect the third compound
d) The third compound is prepared by oxidizing the first compound.

28- Which of the following represents the correct order of processes required to obtain a saturated hydrocarbon from an alcohol that is not oxidized by normal oxidizing agents?

a) Dehydration of ethanol at 180°C followed by hydrogenation
b) Dehydration of 1-propanol with sulphuric acid at 180°C
c) Dehydration of 2-methyl-2-propanol followed by hydrogenation
d) Dehydration of 2-propanol with sulphuric acid at 180°C

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

29- From the following diagram:



Which of the following is true for compounds (W, Z, Y, X)?

a) Compound (X) reacts by addition in one step.

b) Compound (Y) is propanal.

c) Compound (Z) is a primary alcohol.

d) Compound (W) reacts with sodium metal.

30- A carboxylic acid with the formula $C_3H_6O_3$ undergoes the following reactions:

- **Reaction (1):** React as an acid with methanol
- **Reaction (2):** reacts as an alcohol with acetic acid

-Which of the following represents the product of reactions (1) and (2)?

	product of Reaction (1)	product of Reaction (2)
a)	$CH_3CH(OCOCH_3)COOH$	$CH_3CH(OH)COOCH_3$
b)	$CH_3CH(OH)COOCH_3$	$CH_3CH(OCOCH_3)COOH$
c)	CH_3COOCH_3	$CH_3CH(OH)COOH$
d)	$CH_3CH(OH)COOCH_3$	CH_3COOCH_3

31- The correct name for the corresponding compound According to IUPAC system is:

$CuCl_{2\,(aq)}$

(a) 3,4-dimethyl-1-pentyne

(b) 3-propyl-1- butene

(c) 2-ethyl-1- butene

(d) 3-methyl-1-hexyne

$$CH_3 - \underset{\displaystyle C_3H_7}{\underset{|}{CH}} - C_2H$$

32- The following table describes some isomers of the compound C_4H_8:

X	Y	Z	W
Isomers obey Markownikoff's rule	Isomers decolorizes alkaline potassium permanganate	isomers that give by catalytic hydration alcohol difficult to be oxidized	Closed chain isomers

- Which of the following represents the number of each type of these isomers?

	X	Y	Z	W
A	1	2	3	1
B	2	3	1	2
C	2	1	2	3
d	2	2	1	1

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

33- Which of the following describes the processes necessary to obtain the simplest hydrocarbon from the simplest alkyne?

(a) Catalytic hydration – incomplete oxidation – reduction – dry distillation.
(b) Catalytic hydration – complete oxidation – reduction – dry distillation.
(c) Oxidation (Bayer) – complete oxidation – neutralization – dry distillation.
(d) Catalytic hydration – complete oxidation – neutralization – dry distillation.

34- The following table shows the observations or the role of iron (III) chloride when it added to organic compounds (X) and (Y):

Organic substance	Observation or role
(X)	Give violet color
(Y)	Catalyst during preparation

-Which of the following is true for these compounds?

(A) (X) : salicylic acid , (Y): carbolic acid
(b) (X) : Carbolic acid, (Y) : Halo benzene
(C) (X) : Marookh oil , (Y) : Sulphuric acid
(d) (X) : Halo benzene, (Y) : Marookh oil

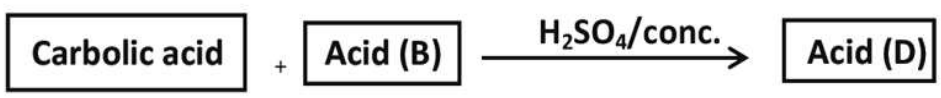
35- From the following reaction:

$$C_6H_5CH_2Cl + C_6H_6 \xrightarrow{AlCl_3} A + B$$

Which of the following represents the compounds (A) and (B)?

(a) A :$C_6H_5CH\,ClC_6H_5$, B :H_2
(b) A :$C_6H_5CH_2C_6H_4$, B :H_2
(C) A :$C_6H_5CH_2C_6H_5$, B :HCl
(d) A :$C_6H_5\,CH_2C_6H_5$, B :Cl_2

36- The following diagram shows how to prepare an organic compound: -



- Which of the following represents the resulting compound (D)?

(a) Trinitrotoluene
(b) Trinitroglycerol
(c) Picric acid
(d) Dacron fiber

37- Upon acidic hydrolysis of propyl formate ester, compound (X) is produced, which reacts with sodium hydroxide.

- All of the following are properties of compound (X) except:

(a) It has no isomers
(b) Its molecular formula is CH_2O_2
(c) It reacts with halogenated acids
(d) It is secreted by some insects

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

38- An alcohol that cannot be prepared by catalytic hydration, All of the following applies on this alcohol except?

(a) It can be prepared by the general method for preparing alcohols.
(b) It has structural isomers.
(c) It has harmful effects on human health.
(d) It is used in the preparation of esters.

39- (A) and (B) are organic compounds. The molecular formula of alcohol (A) is C_2H_6O and that of compound (B) is $C_7H_6O_3$.

- Compounds (A) and (B) are similar in that they both:

(a) are used in medical fields.
(b) react with sodium hydroxide.
(c) Used in the manufacture of Dacron fibers.
(d) React with hydrochloric acid.

40- All of the following substances decolorize a potassium permanganate solution in an acidic medium except:

(a) Hydroxy cyclohexane
(b) Isobutyl alcohol
(c) 2-bromo-2-propanol
(d) 2-hydroxy propanoic acid

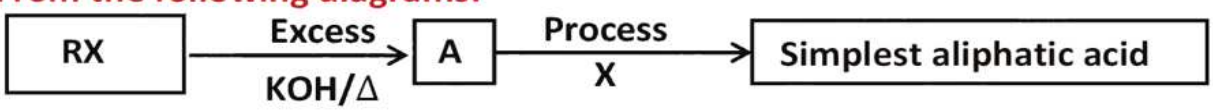
40- The following diagram shows the steps that organic compound (A) undergoes to obtain organic compound (E):

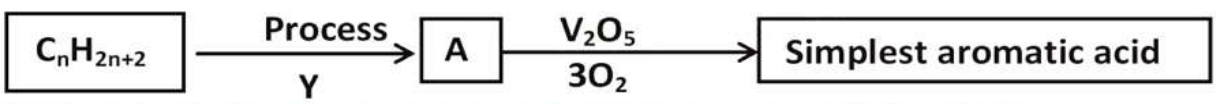
$$A \xrightarrow{NaOH,CaO/\Delta} B \xrightarrow{Cl_2} C \xrightarrow{KOH} D \xrightarrow{Oxidation} E$$

-Which of the following represents (A, C, E)?

choices	A	C	E
A	Sodium butanoate	2-chloropropane	propanal
B	Sodium pentanoate	1-chlorobutane	Butanoic acid
C	Sodium butanoate	1-chloro propane	propane
d	Sodium pentanoate	2-chloro butane	Butanoic acid

41- From the following diagrams:





-Which of the following expresses chemical processes (X) and Y?

(a) X: Acidic hydrolysis , Y: Alkaline hydrolysis
(b) X: Complete oxidation , Y: catalytic reforming
(c) X: Partial oxidation , Y: Ester formation
(d) X: Alkaline hydrolysis , Y: Acid hydrolysis

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

39- Three organic acids:

(A) Contains an oxidizable alcoholic group.

(B) Contains a non-oxidizable alcohol group.

(C) Does not contain any alcohol groups.

Which of the following expresses compounds (C, B, A)?

(a) A : $C_3H_6O_3$, B: $C_6H_8O_7$, C: C_6H_6O

(b) A : $C_6H_8O_7$, B: C_6H_6O , C: $C_6H_3O_7N_3$

(c) A : C_6H_6O , B: $C_6H_8O_7$, C: $C_3H_6O_3$

(d) A : $C_3H_6O_3$, B: $C_7H_6O_3$, C: C_6H_6O

40- If you know that compounds (A) and (B) are hydrocarbons with the following formulas:

A: $(CH)_6$, B: $(CH_2)_6$

-Which of the following applies to compounds (A) and (B)?

(a) A: is produced by the catalytic reforming method of heptane
B: is produced by the hydrogenation of hexane

(b) A: has the molecular formula C_nH_{2n}
B: has the molecular formula C_nH_n

(c) A: Produced by the reduction of carbolic acid
B: Produced by the hydrogenation of compound (A)

(d) A: An open-chain alkane
B: Produced by cyclic polymerization

41- From the following diagram:

-If you know that (C) is an unsaturated aliphatic hydrocarbon

- Which of the following statements is correct for compounds (A, B, C, D)?

a) (A) : Propanoic acid , (B) : Propanol , (C) : Propene

b) (A) : Ethyl alcohol , (B) : Acetaldehyde , (D) : Acetic acid

c) (A): Propanoic acid , (C): Propane , (D) : Propanol

d) (A) : Ethyl alcohol , (B) Acetic acid , (D) : Acetaldehyde

42- Two organic compounds(X) and (Y):

(X) : Hydrocarbon reacts violently with chlorine, accompanied by light and flame.

(Y) : Halogenated derivative of hydrocarbon used as insecticides.

- Which of the following is true?

(a) X : Aromatic hydrocarbon obey to the formula C_nH_{2n-6}

(b) Y : Aromatic derivative obey to the formula $C_nH_{n-1}Cl$

(c) X : Aliphatic hydrocarbon obey to the formula C_nH_{2n}.

(d) Y : An aliphatic obey with the formula $C_nH_nCl_n$

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

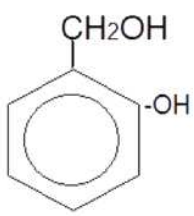
43- Alkane has the molecular formula C_6H_{14} and contains four methyl groups and doesn't contain methylene groups.
-Which of the following expresses the IUPAC name for this compound?
(a) 2,2-dimethyl butane (b) 3,3-dimethyl butane
(c) 2,3-dimethyl butane (d) 4,1-dimethyl butane

44- Which of the following is the number of isomers of open-chain aliphatic compounds and don't react with sodium metal for the formula $C_4H_{10}O$?
(a) 3
(b) 4
(c) 5
(d) 7

45- Which of the following describes a method for preparing 2-methyl propane?
(a) Neutralization of 2-methyl propanoic acid followed by dry distillation.
(b) Dehydration of 1-propanol followed by hydrogenation.
(c) Neutralization of 3-methyl butanoic acid followed by dry distillation.
(d) Dehydration of 1-butanol followed by hydrogenation.

46- Which of the following expresses the correct order of operations processes required to obtain benzene from a compound with the formula $C_6H_{13}COOH$?
(a) Reduction – dehydration– oxidation
(b) Neutralization – dry distillation -hydrogenation
(c) Reduction – dehydration –catalytic reforming
(d) Neutralization – dry distillation – catalytic reforming

47- Which of the following expresses the use of the compound produced from complete oxidation of the opposite compound?
(a) Preparation of Dacron fabric
(b) Preparation of drugs
(c) Preparation of Bakelite
(d) Preparation of explosives



48- (X, Y) organic carboxylic acids:
X: An aromatic acid every mole can reacts with 2 moles of caustic soda.
Y: An aliphatic acid every mole can reacts with 3 mole of caustic soda then 1 mole of sodium metal
Which of the following may represents acids(X) and (Y)?
(a) (Y) : lactic acid secreted by the body during hard effort.
(b) (Y) : citric acid, used as a preservative for frozen fruits.
(c) (X) : Terphthalic acid, used in the manufacture of synthetic silk.
(d) (X) : salicylic acid, used in manufacture of Dacron fibers

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

49- (Y, X, Z) Three organic compounds:

X: The simplest aliphatic hydroxylic compound

Y: The simplest aromatic hydroxylic carboxylic acid

Z: Produced from the reaction of (X) and (Y)

- Which of the following expresses each of (Z,Y,X)?

	X	Y	Z
A	Methyl alcohol	Salicylic acid	Acetyl salicylic
B	Ethyl alcohol	Benzoic acid	Ethyl benzoate ester
C	Methyl alcohol	Salicylic acid	Methyl salicylate ester
d	Phenol	Formic acid	Phenyl Formate ester

50- Which of the following represents the product of alkaline hydrolysis of the 1-bromo-2-methyl propane?

(a) Secondary propyl alcohol (b) Isobutyl alcohol

(c) 2-methyl-2-propanol (d) tertiary butyl alcohol

51- Two organic compounds (X) and (Y):

(X): 1-bromo-1-propanol

(Y): 2-bromo-2-propanol

-The following processes were carried out in order for each of the compounds (X) and (Y) separately: (alkaline hydrolysis – reduction)

-Which of the following expresses the final result of these processes on each of the compounds (X) and (Y)?

	Product of (X)	Product of (Y)
A	Propanal	Propanone
B	Propanal	2-propanol
C	1-propanol	2-propanol
d	1-propanol	propanone

52- Which of the following describes the processes necessary to obtain a polymer used in electrical appliances?

(a) Alkaline hydrolysis of 1-chloroheptane – polymerization with formaldehyde

(b) Oxidation of ortho-hydroxy toluene – polymerization with ethylene glycol

(c) Alkaline hydrolysis of 1-chloroheptane – oxidation – polymerization with Ethylene glycol

(d) Catalytic forming of 1-chlorohexane – alkaline hydrolysis – polymerization with Formaldehyde

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

53- When one farad is passed through a molten sodium chloride, which of the following expresses the number of moles of gases evolved?

(a) 0.5 mol
(b) 1 mol
(c) 1.5 mol
(d) 2 mol

54- (A) and (B) Organic acids:

(A): Does not respond to acidity test.

(B): Used in the preparation of a compound used to treat headaches.

-Which of the following represents acids (A) and (B)?

(a) (A) is acetic acid, while (B) is salicylic acid.
(b) (A) is an acid that does not reduce by hydrogen in presence of copper II Chromate, while (B) is salicylic acid.
(c) (A) Acetic acid, while (B) is benzoic acid.
(d) (A) Carbolic acid, while (B) is an acid that can be prepared by oxidizing Para-methyl toluene.

55- From the following diagram:

Which of the following represents the compound (Z)?

(a) Benzyl ethanoate
(b) Ethyl benzoate
(c) Phenyl ethanoate
(d) methyl benzoate

56- From the following table that illustrates 3 experiments :

Experiment number	Organic compound	The added solution	Observation
1	X	CH_3OH	Fruity odor evolved
2	Y	acidified $KMnO_4$	Violet color disappear
3	Z	Bromine water	White precipitate is formed

-Which of the following represents the compounds (X,Y and Z)?

(a) (X): Acetic acid , (Y): 2-propanol , (Z): Carbolic acid
(b) (X): Carbolic acid , (Y): 2-methyl-2-propanol, (Z): Acetic acid
(c) (X): Methanoic acid , (Y): Benzoic acid , (Z): Carbolic acid
(d) (X): Acetaldehyde , (Y): 2-propanol , (Z): Carbolic acid

57- Which of the following expresses the correct order of chemical processes necessary to prepare propane from propyl propanoate?

(a) Alkaline hydrolysis → Dry distillation of acid salt → Catalytic hydrogenation
(b) Alkaline hydrolysis → Dehydration → Catalytic hydrogenation
(c) Acidic hydrolysis → oxidation → dehydration
(d) Acidic hydrolysis → oxidation → addition of sodium hydroxide

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

58- Two organic compounds, (X) and (Y):

X: An aliphatic compound that, upon oxidation, produces a compound used in Polyester production.

Y: An aromatic compound whose sodium salt is used to prevent growth of fungi.

-Which of the following is correct?

a) Compound (X) obey to the formula $C_nH_{2n+2}O_2$ and does not contain a carboxyl group.

b) Compound (Y) does not obey the formula $C_nH_{2n}O_2$ and contains a carboxyl group.

c) Compound (X) obey to the formula $C_nH_{2n+2}O_2$ and contains a carboxyl group.

d) Compound(Y) obey to the formula $C_nH_{2n}O_2$ and contains a carboxyl group.

59- Which of the following hydroxyl compounds cannot be obtained by ammonolysis of an ethyl benzoate isomer?

a) C_6H_5OH

b) $C_6H_5CH_2CH_2OH$

c) $C_6H_5CH_2OH$

d) C_2H_5OH

60- The following equation illustrates one of the thermal catalytic cracking processes:

$$C_{20}H_{42(s)} \xrightarrow{\text{Heat/ Pressur / } cat.} X_{(l)} + Y_{(g)} + Z_{(l)}$$

X: An alkene containing 30 mol of atoms per mole.

Y: The heaviest gaseous alkene.

- Which of the following does not represent compound (Z)?

a) It is produced from the hydrogenation of hexyne.

b) It reacts with hydrogen halides (HBr) according to Markownikoff's rule.

c) Its catalytic reforming yields a compound used as organic solvent.

d) It has the general formula C_nH_{2n+2}.

61- X, Y, and Z are three hydrocarbon derivatives:

X: has the general formula $C_nH_{2n}O_2$ and reacts with active metals.

Y: has the general formula $C_nH_{2n}O_2$ and does not react with active metals.

Z: has the general formula $C_nH_{2n+2}O$ and reacts with active metals.

If the molar masses of (X, Y, and Z) are equal, which of the following is correct regarding their boiling points?

a) (Y) has a higher boiling point than (Z).

b) (Z) has a higher boiling point than (X).

c) (Y) has a higher boiling point than (X).

d) (X) has a higher boiling point than (Z).

62- An organic compound with the molecular formula $C_5H_{10}O_2$ has a complex Functional group of two functional groups.

- Which of the following could be the IUPAC name for this compound?

a) 2,2-Dimethyl butanoic acid

b) Methyl butanoate

c) Ethyl propanoate

d) 2,2-Dimethyl propanoic acid

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

63- Which of the following represents the correct order of some organic compounds according to the amount of oxygen required for the complete combustion of one mole?

a) Methane > Ethane > Ethyne

b) Ethane > Ethene > Ethyne

c) Ethyne > Ethene > Ethane

d) Ethyne > Ethene > Methane

64- Compound A, produced by the fractional distillation of coal tar, the following reactions, in order, under the standard conditions for each occurs for compound A: (Chlorination by substitution - Reaction with sodium hydroxide - Nitration)

-Which of the following represents a use of the produced compound?

a) Insecticide

b) Widen arteries

c) Explosive substance

d) Bakelite polymer

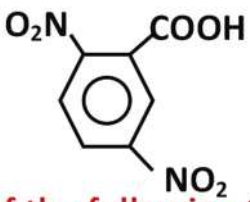
65- Which of the following is the IUPAC name of the compound shown?

a) 3,6-dinitro benzoic acid

b) 2,5-dinitro benzoic acid

c) Meta, para-dinitro benzoic acid

d) 3,5-dinitro benzoic acid



66- Which of the following describes the properties of each of the following types of alcohols?

a) Primary and secondary alcohols react with sodium metal, while tertiary do not.

b) Primary alcohols are oxidized only to form a mixture of aldehyde and ketone at the end of the reaction.

c) Primary alcohols have a continuous carbon chain, while secondary and tertiary alcohols have branched carbon chains.

d) Primary and secondary alcohols react with acidified potassium permanganate, while tertiary do not.

67- Three organic compounds are used in the manufacture of polymers:

(Reaction of compound (1) with compound (2)) gives polymer used to treat heart disease.

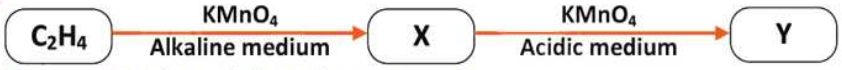
- (Reaction compound 3 with an aldehyde) gives polymer used in the manufacture Of cigarette ash trays.

- Which of the following represents each of the three compounds?

	Compound 1	Compound 2	Compound 3
a)	Ethyne	Hydrogen fluoride	Teflon
b)	Ethylene glycol	Phthalic Acid	Carbolic acid
c)	Ethylene Glycol	Terphthalic Acid	Carbolic acid
d)	Phthalic Acid	Carbolic acid	Ethylene Glycol

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

68- From the following diagram:



-Which of the following is true?

a) (X): Used in the manufacture of insecticides, (Y): Dibasic acid

b) (X): Used in car radiators, (Y): Removes the color of acidified $KMnO_4$

c) (X): Used in the manufacture of polymers, (Y): Is $C_2H_2O_4$

d) (X): Used in the treatment of burns, (Y): Is $C_2H_2O_4$

69- By performing the following processes (in order) on Organic acid that has a pungent odor and freezes at 16℃):

(Neutralization - Dry distillation - Heating then rapid cooling - Trimerization).

- Which of the following represents the final product of these processes?

a) Branched aromatic hydrocarbon.

b) Unsaturated aliphatic hydrocarbon.

c) Unbranched aromatic hydrocarbon.

d) Saturated aliphatic hydrocarbon.

70- Which of the following represents the correct order of processes required to obtain the compound with the formula C_6H_5COOH from a compound with the formula $C_7H_{15}COOH$?

a) Catalytic reforming - Dry distillation - Oxidation - Neutralization

b) Neutralization - Dry distillation - Oxidation - Catalytic reforming

c) Thermal catalytic cracking - Catalytic reforming - Neutralization

d) Neutralization - Dry distillation - Catalytic reforming - Oxidation

71- Three organic compounds:

(A) : An aliphatic organic compound with the general formula $C_nH_{2n+2}O_z$

(B) : An aromatic acid containing two different functional groups

(C) : A liquid organic compound used in the manufacture of artificial fats and as a Base for manufacture of compound with a general formula $C_nH_{2n+2}O_3$

- Which of the following is true for compounds A, B, and C?

a) Compound (A) effervesces when sodium bicarbonate is added to it.

b) Compound (B) turns potassium dichromate from orange to green.

c) Compound (C) removes the color of alkaline potassium permanganate solution.

d) Compound (A) gives a purple color with Iron III chloride solution.

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

72- Compounds (X and Y) are hydrocarbon derivatives where:
(X): is produced from the chlorination of the compound resulting from the dry Distillation of sodium acetate by replacing three hydrogen atoms
(Y): is produced from the dehydration of 2-chloro ethanol at $180^{o}C$.
- Which of the following represents (X or Y)?
(a) (X): Alkane derivative used in dry cleaning.
(b) (Y): Alkane derivative used as a raw material in the manufacture of floor insulation.
(c) (X): Alkene derivative was used as anesthetic.
(d) (Y): Alkene derivative used as a raw material in the manufacture of water hoses.

73- Which of the following compounds burns completely to produce (5) moles of CO_2 and (5) moles of water vapor?
A) 2-methyl butane
B) 2,2- dimethyl -2-butene.
c) 1,1- dimethyl cyclo propane.
d) 2-pentyne.

74- (X and Y) are two isomers of the formula C_4H_8O with different functional groups If (X) turns acidified potassium dichromate to green, while (Y) has no effect on Acidified potassium dichromate.
-Which of the following represents (X) or (Y)?
a) X: 2-methyl-1-propanol. b) Y: 2-methyl propanal.
C) X: 2-methyl propanal. d) Y: 3-methyl-2-butanone.

75- The corresponding structure of one of polymers:-
- Which of the following expresses the monomer properties of this polymer?
a) It reacts by addition according to Markownikoff's rule.
b) It reacts with HBr to give 1-bromo-butane.
C) It reacts with catalytic hydration to give 2-butanol.
d) It reacts with bromine to give 2,2-dibromo butane.

76- Three organic compounds:
(A) : C_2H_4O
(B) : C_2H_6O
(C) : C_2H_4 :
- Which of the following is correct?
a) Oxidation of both (A, C) produces an acid used in the manufacture of dyes.
b) Oxidation of both (A, B) produces an acid used in the manufacture of insecticides.
c) (B) produced from reduction of (A), and difficult to be oxidized
d) Reduction of (A) and oxidation of (C) gives the same products

77- A compound has the molecular formula: C_7H_7NO
-Which of the following esters can be used to prepare that compound?
a) C_6H_5 COO-CH_3 b) C_6H_5-OOC- CH_3
c) C_6H_5CO-NH_2 d) CH_3-COO-CH_3

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

78- (X, Y and Z) are three hydrocarbon derivatives have the following molecular Formulas:

(X): CH_2O

(Y): C_2H_6O

(Z): $C_2H_6O_2$

-Which of the following represents (X, Y and Z)?

78-

	(X)	(Y)	(Z)
a)	Ketone	aliphatic Ether	Primary dihydric alcohol
b)	Aldehyde	Primary monohydric alcohol	Primary dihydric alcohol
C)	Carboxylic acid	Monohydric secondary alcohol	Aliphatic ester
d)	Aldehyde	aliphatic Ether	Carboxylic acid

79- Three organic compounds (A, B and C):-

- When adding excess of NaOH to the three compounds:

(B): Consumes quantity of NaOH double that consumed by (A)

(C): doesn't react

-When heating (A) with (C), the produced compound is used as a flavor

Which of the following represents compounds (A), (B), and (C)?

a) (A) :$C_3H_6O_3$, (B) :$C_7H_6O_3$, (C) : C_2H_6O

b) (A) :$C_7H_6O_3$, (B) $C_3H_6O_3$, (C) C_2H_6O

c) (A) :C_2H_6O, (B): $C_3H_6O_3$, (C) :$C_7H_6O_3$

d) (A): $C_3H_6O_3$,(B): C_2H_6O,(C): $C_7H_6O_3$

80- The following table shows the molecular formulas of organic compounds:

A	B	C
$C_3H_8O_3$	$C_3H_8O_2$	$C_2H_4O_2$

-Which of the following represents the correct order of the compounds (C, B, A) according to boiling point?

(a) C > B > A (b) A > C > B (c) B > A > C (d) A > B > C

81- Which of the following is the correct IUPAC name for the product of hydrolysis of the compound $C_6H_5OOCCH_3$ in an acidic medium?

a) Acetic acid and hydroxy benzene

b) Ethanoic acid and phenol

c) Methanol and benzoic acid

d) Methyl alcohol and benzoic acid

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

82- Three organic compounds with the molecular formula C_3H_8O

(X): Decolorizes acidified potassium permanganate solution and forms a compound That reacts with sodium carbonate.

(Y): Decolorizes acidified potassium permanganate solution and forms a compound That does not respond to acidity test.

(Z): Does not decolorize acidified potassium permanganate solution.

-Which of the following expresses the number of methyl groups in each of (X, Y and Z)?

	(X)	(Y)	(Z)
A	1	0	2
B	2	1	2
C	2	2	1
D	1	2	2

83- (A) and (B) are hydroxyl organic compounds, the (O-H) bond in compound (A) is Longer and weaker than that in compound (B) .

-Which of the following is correct?

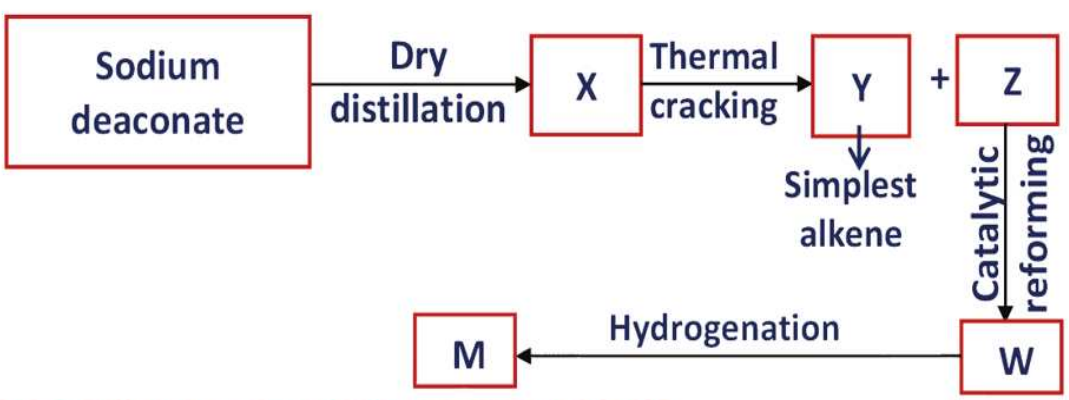
a) (A and B) react with sodium hydroxide

b) (A and B) react with HCl acid

c) (A) reacts with sodium hydroxide while (B) does not react

d) Both compounds (A) and (B) can be detected with $FeCl_3$ solution

84- From the following diagram:



- Which of the following describes compound (M)?

A) (M): Saturated cyclic hydrocarbon, W: Oxidizes to an aromatic acid

B) (M): Cyclohexane , W: Oxidizes to an aromatic acid

c) (M): Aromatic hydrocarbon , W: gives substitution derivatives in the para position

d) (M): Aliphatic hydrocarbon , W: gives substitution derivatives in the meta position

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

85-Three organic acids (A, B, C):

(A): Produced by the reaction of a 3 moles of caustic soda with 1mole of 1,1,1-Trichloroethane.

(B): Produced by the fermentation of lactose in milk by certain types of bacteria.

(C): Reacts with methanol to form a substance used to remove rheumatic pain

- Which of the following represents the above acids?

a) (A) :$C_2H_4O_2$, (B) :$C_3H_6O_3$, (C) : $C_7H_6O_3$

b) (A) :$C_3H_6O_3$, (B): $C_2H_4O_2$, (C) : $C_7H_6O_3$

C) (A) :$C_2H_4O_2$, (B): $C_7H_6O_3$, (C) : $C_3H_6O_3$

d) (A) : $C_3H_6O_3$, (B):$C_7H_6O_3$, (C) : $C_2H_4O_2$

86-(X and Y) are carboxylic acids with the following molecular formulas:

(X): ($C_7H_6O_3$)

(Y): ($C_3H_6O_3$)

-Which of the following expresses the reaction of one mole of (X and Y) with the substances listed in the table?

	Number of required Na moles for the acid (Y)	Number of required Na moles for the acid(X)	Number of required NaOH moles for the acid(Y)	Number of required NaOH moles for the acid (X)
a	1	1	1	1
b	2	2	1	2
C	2	2	2	1
d	2	2	2	2

87- From the following reactions:

1-$CH_2Br\text{-}CF_3 + Cl\text{-}Cl \xrightarrow{400^\circ C} X$

2-$C_2H_2 + H_2O \xrightarrow{HgSO4\ /H2SO4} Y\ (\text{stable compound}) \xrightarrow{\text{oxidation}} Z$

Which of the following represents compounds (X, Z)?

a) X: A hydrocarbon used as a safe anesthetic.

b) Z: An acid used in preserving fruits and vegetables.

c) X: A hydrocarbon derivative used as a safe anesthetic.

d) Z: An alcohol used in pesticides.

88- Alkylation of toluene produces two isomers (X, Y). Complete oxidation of isomer (X) produces a compound used in the manufacture of artificial heart valves.

- Which of the following represents (X, Y)?

a) (X): 1,2-Dimethyl benzene.

b) (Y): 4-Methyl toluene.

c) (Y): Its oxidation produces phthalic acid.

d) (X): Its oxidation produces phthalic acid.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

89- A branched gaseous alkane can be obtained by the dry distillation of:

a) 2-Methyl sodium pentanoate.
b) 2-Methyl sodium hexanoate.
c) 3-Methyl sodium butanoate.
d) 3-Methyl sodium pentanoate.

90- Upon catalytic hydration of 3-methyl-1-butyne, compound (X) is produced.
Which of the following expresses the general formula of compound (X)?

a) $C_nH_{2n}O$, decolorizes permanganate.
b) $C_nH_{2n}O$, does not decolorize permanganate.
c) $C_nH_{2n+2}O$, decolorizes permanganate.
d) $C_nH_{2n+2}O$, does not decolorize permanganate.

91- From the diagram opposite:

- Which of the following represents the product of chlorination of compound (X) in the presence of $FeCl_3$?

a) Meta chloro ethyl benzene only
b) Para chloro ethyl benzene only
c) A mixture of ortho and para chloro ethyl benzene
d) A mixture of ortho and para chloro methyl benzene

92- An aromatic liquid (X) with a boiling point of 80°C undergoes the following reactions:

The reaction	Reaction conditions	Reaction product
X + chlorine	UV	Y
X + chlorine	UV/$FeCl_3$	Z

- Which of the following is true?

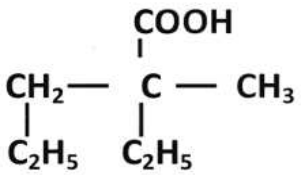
a) (Y) Aliphatic derivative
b) (Y) Aromatic hydrocarbon
c) (Z) Aromatic hydrocarbon
d) (Z) Aliphatic derivative

93- When an excess of NaOH solution is added to dicarboxylic acids (X & Y):
In case of acid (X), a salt with the formula NaOOC–COONa is formed
In case of acid (Y), a salt with the formula $C_6H_4(COONa)_2$ is formed
- Which of the following represents the two acids? (X & Y)?

a) X: Oxalic acid , Y: Phthalic acid
b) X: Oxalic acid , Y: Benzoic acid
c) X: Phthalic acid , Y: Ethanoic acid
d) X: Oxalic acid , Y: Salicylic acid

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

94- Which of the following is the correct IUPAC name for the compound shown in The figure?



a) 2,3-Diethyl-2-methyl propanoic acid
b) 2-Methyl-2-ethyl pentanoic acid
c) 2-Methyl-2-propyl propanoic acid
d) 2-Ethyl-2-methyl pentanoic acid

95- By alkaline hydrolysis of compound (X), we obtain the simplest alcohol containing an ethyl group as branch.
- Which of the following is the name of compound (X)?
a) 3-Chloro-2-ethyl pentane
b) 1-Chloro-2-ethyl butane
c) 2-Chloro-2-ethyl propane
d) 2-Chloro-2-ethyl pentane

96- When 1-propanol is dehydrated then water is added to the resulting compound In the presence of a catalyst, compound (X) is produced.
- Which of the following represents compound (X)?
a) It decolorizes bromine dissolved in carbon tetrachloride and 1,2-dibromopropane is formed
b) It oxidizes by acidified potassium permanganate and propanoic acid is formed
c) It decolorizes acidified potassium permanganate and propanone is formed
d) It oxidizes by hydrogen peroxide to a dihydric alcohol

97- Glycolic acid (hydroxy ethanoic acid), with the formula $HO\text{-}CH_2COOH$, the following experiments were performed on it:
Experiment (A): Reaction with methanol
Experiment (B): Reaction with acetic acid
Which of the following represents the chemical formula of the product of experiments (A) and (B)?

	The result of experiment (A)	The result of experiment (B)
a)	$HO\text{-}CH_2\text{-}COOCH_3$	$CH_3COO\text{-}CH_2\text{–}COOH$
b)	$CH_3\text{-}COO\text{-}CH_2COOH$	$HO\text{-}CH_2\text{-}COOCH_3$
c)	$HO\text{-}CH_2COOH$	$CH_3\text{-}COO\text{-}CH_2\text{-}COO\text{-}CH_3$
d)	$CH_3O\text{-}CH_2COOH$	$HO\text{-}CH_2COO\text{-}CH_3$

98- (A, B and C) Three organic compounds have the following molecular formulas:
(A): $C_3H_6O_3$ (B): $C_2H_4O_2$ (C): $C_4H_8O_2$
The ammonolysis of compound (C) gives the amide of compound (B).
Each of the following represents the reactions of compounds (A, B and C) except:
a) (A) and (B) react with metal carbonates, while (C) does not.
b) (A) does not react with (B) but react with alcohols.
c) (A) and (B) react with active metals, while (C) reacts with metal hydroxides upon heating.
d) One of the isomers of (C) reacts with active metals, their hydroxides, carbonates, and bicarbonates.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

99- (M) is an organic compound that can be obtained by the following steps in order:
(1) Neutralizing acid (X) with caustic soda, then heating the product strongly in the Presence of soda lime to prepare gas (Y)
(2) Chlorination of gas (Y) at 400°C to obtain (Z)
(3) Reacting (Z) with the simplest aromatic hydrocarbon to obtain (W)
(4) Oxidizing (W) in the presence of V_2O_5 to obtain (M)
Which of the following represents organic compounds (X, Y, Z, W, M)?

	Acid (X)	Gas (Y)	Compound (Z)	Compound (W)	Product (M)
a)	Propanoic acid	Ethane	Chloro ethane	Ethyl benzene	Benzoic acid
b)	Acetic acid	Methane	Chloro methane	Toluene	Benzaldehyde
c)	Acetic acid	Methane	Chloro methane	Toluene	Benzoic acid
d)	Acetic acid	Methane	dichloro methane	Phenol	Salicylic acid

100- From the following diagram:

$$(A) \xrightarrow[\text{water}]{\text{Dropping}} (B) \xrightarrow{\text{Red hot nickel tube}} (C) \xrightarrow{Cl_2/FeCl_3} (D) \xrightarrow[300^\circ C/300at]{NaOH} (E) \xrightarrow[\text{nitration}]{\text{Complete}} (F)$$

Which of the following represents each of (C, E and F)?

	(C)	(E)	(F)
a)	Aromatic Benzene	Phenol	Picric Acid
b)	Aromatic Benzene	Chlorobenzene	TNT
c)	Toluene	Phenol	Picric Acid
d)	Acetylene	Aromatic Benzene	Phenol

101- Which of the following represents the correct order of chemical reactions required to obtain propane from a compound with the chemical formula $CH_3CH_2COOCH_2CH_2CH_3$?

a) Alkaline hydrolysis → Dry distillation → Catalytic hydrogenation

b) Alkaline hydrolysis → Dehydration → Catalytic hydrogenation

c) Acidic hydrolysis → Oxidation → Dehydration

d) Acidic hydrolysis → Reduction → Dehydration

102- (X, Y) are two salts of organic acids with the following chemical formulas:
X: $(HCOO)_2Ca$
Y: $(COO)_2Ca$
Which of the following choices expresses the number of moles of organic acid and base required to prepare one mole of each of the two salts (X and Y)?

a) X: 1 mol of oxalic acid and 2 mol of calcium hydroxide
Y: 1 mol of formic acid and 1 mol of calcium hydroxide

b) X: 2 mol of formic acid and 2 mol of calcium hydroxide
Y: 1 mol of oxalic acid and 1 mol of calcium hydroxide

c) X: 2 mol of oxalic acid and 2 mol of calcium hydroxide
Y: 1 mol of formic acid and 1 mol of calcium hydroxide

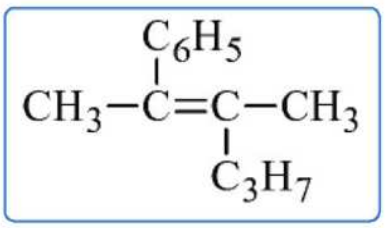
d) X: 2 mol of formic acid and 1 mol of calcium hydroxide
Y: 1 mol of oxalic acid and 1 mol of calcium hydroxide

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

103- Which of the following represents a compound that don't decolorizes bromine Dissolved in carbon tetrachloride?

(a) The product of dropping of water on calcium carbide
(b) The product of the catalytic reforming of hexane
(c) The product of adding concentrated sulphuric acid to propanol at 180°C
(d) The product of strong heating followed by rapid cooling of the dry Distillation product of sodium acetate

104- Which of the following is the IUPAC name of the corresponding compound?

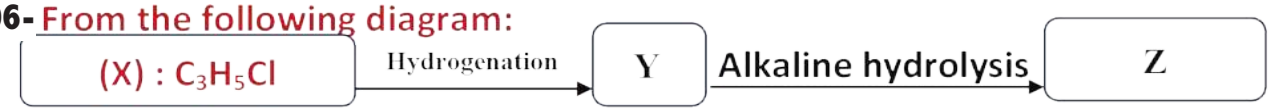


a) 3-propyl-2-phenyl-2-butene
b) 2,3-dimethyl-4-phenyl-3-pentene
c) 4,3-dimethyl-2-phenyl-2-pentene
d) 2-phenyl-3-methyl-2-hexene

105- Upon hydrolysis in an acidic medium for propyl benzoate an acidic compound (X) is produced. When compound (X) reacts with the simplest aliphatic alcohol, compound (Y) is produced. Which of the following is the isomer of compound (Y)?

a) Phenyl formate
b) Butyl formate
c) Phenyl acetate
d) Phenyl benzoate

106- From the following diagram:



-Which of the following represents the number of isomers for each formula of (X,Y,Z)?

	Number of Isomers of (X)	Number of Isomers of (Y)	Number of Isomers of (Z)
(a)	3	3	3
(b)	4	2	2
(C)	2	2	2
(d)	4	3	2

107- (X): A primary alcohol with one alcoholic isomer
(Y): A hydrocarbon produced by the dehydration of compound (X)
(Z): An isomer of compound (Y)

- Which of the following represents the properties of compound (Z)?

a) More stable than normal propane
b) Burns faster than cyclic butane
c) Burns slower than normal hexane
d) Less reactive than cyclic pentane

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

108- Two organic compounds (X, Y), compound (X) has the formula $C_2H_6O_2$, while compound (Y) has the formula $C_2H_4O_2$. Which of the following is correct?

a) Both react with sodium hydroxide

b) Both react with halogenated acids

c) Both are oxidized by potassium permanganate solution

d) When they react together, an ester is formed

109- Two organic compounds (A, B) are open-chain hydrocarbons.

- Burning one mole of compound (A) produces 3 moles of CO_2
- Burning one mole of compound (B) produces 3 moles of H_2O

If you know that (A) undergoes a substitution reaction while (B) undergoes an addition reactions in a one step, then:

a) (A) is a gaseous alkane, (B) is a liquid alkane

b) (A) is a liquid alkane, (B) is a liquid alkene

c) (A) is a gaseous alkane, (B) is a liquid alkene

d) (A) is a gaseous alkene, (B) is a liquid alkyne

110- Compounds (A) and (B) are prepared by nitration, where:

(A): is prepared by nitration of an aromatic hydrocarbon.

(B) : is prepared by nitration of an aromatic hydrocarbon derivative.

Which of the following represents compounds (A) and (B)?

(a) (A) : Meta-nitro-toluene , (B): Meta-nitro benzoic acid

(b) (A) : 4-Nitro-toluene , (B) : 3-Nitro benzoic acid

(C) (A) : Ortho-nitro-toluene , (B) : 2-nitro benzoic acid

(d) (A) : 2-nitrotoluene , (B): para-nitro benzoic acid

111- Three organic compounds (X, Y and Z) have the molecular formulas:

(X): C_2F_4

(Y): $C_2H_4O_2$

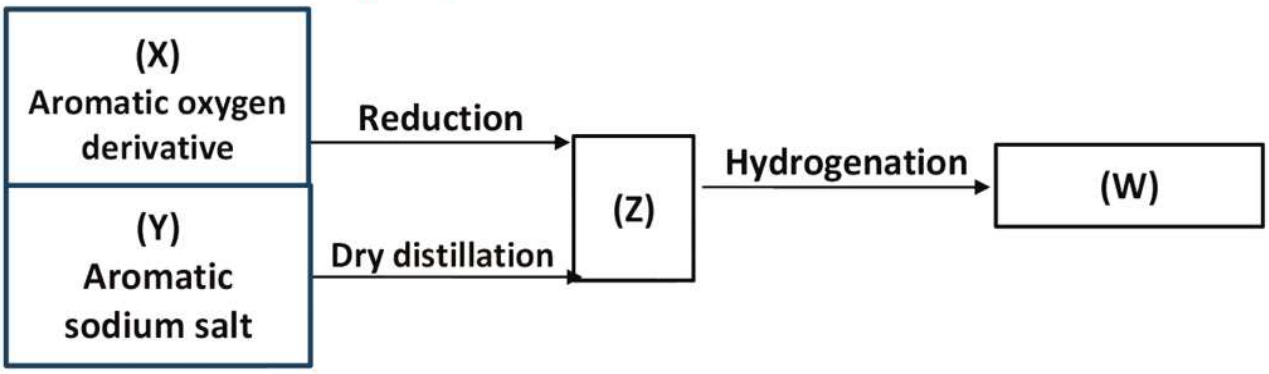
(Z): CCl_2F_2

-Which of the following correctly represents each compound?

	Compound (X)	Compound (Y)	Compound (Z)
a)	Alkene derivative: Used as a raw material in the lining of cooking utensils.	Aliphatic acid: Used in the manufacture of synthetic silk.	Alkane derivative: Used as a Cooling agent.
b)	Alkane derivative: Used in surgical threads.	Aromatic acid: Used as a food preservative.	Alkene derivative: Used as a cleaner of electric sets.
c)	Alkane derivative: Used as a raw material in the lining of cooking utensils.	Aliphatic ester: Used as a Flavor and Oduor enhancers	Alkane derivative: Used as rushed substance for liquids.
d)	Alkene derivative: Used in the manufacture of plastics.	Aliphatic acid: Used in the manufacture of explosives.	Alkene derivative: Used as an insecticide.

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

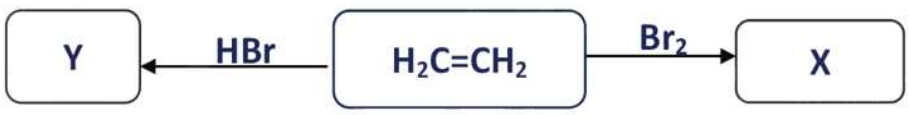
112- From the following diagram:



- Which of the following is correct?

a) (Y) Ortho methyl sodium benzoate, (X) Ortho methyl phenol, (W) Cyclohexane.
b) (Y) Para methyl sodium benzoate, (Z) Methyl benzene, (W) Cyclohexane.
c) (X) Para methyl phenol, (Z) Methyl benzene, (W) Methyl cyclohexane.
d) (X) Phenol, (Y) Ortho methyl sodium benzoate, (W) Methyl cyclohexane.

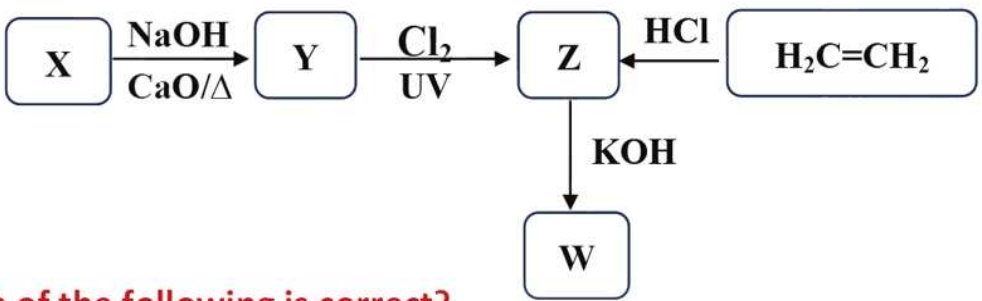
113- From the following diagram:



-When an abundance of KOH is added to both Y and X, which of the following represents the compound produced in each case?

a) In case of X: a secondary alcohol is produced, used in thermometers.
b) In case of Y: a secondary alcohol is produced, used as a sterilizing of mouth &tooth.
c) In case of X: a primary alcohol is produced, which is a monomer of PEG.
d) In case of Y: a primary alcohol is produced, used in pen inks.

114- From the following diagram:

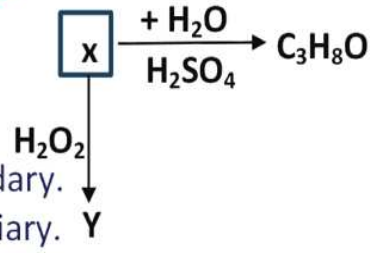


Which of the following is correct?

a) X : is sodium ethanoate , W: is a secondary alcohol.
b) X : is sodium propanoate , W: is a primary alcohol.
c) X : is sodium ethanoate , W: is a primary alcohol.
d) X : is sodium propanoate , W: is a secondary alcohol.

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

115- The following reaction took place under suitable conditions:



Which of the following is correct?

a) Both (Y) and C_3H_8O contain a secondary carbinol group.

b) Both (Y) and C_3H_8O contain a primary carbinol group.

c) The carbinol group in C_3H_8O is primary, while in (Y) it is secondary.

d) The carbinol group in C_3H_8O is secondary, while in (Y) it is tertiary.

116- You have the following organic compounds:

(X: C_7H_8) (Y: C_6H_6O) (Z: $C_7H_6O_2$) (L: $C_6H_{14}O_6$)

-The compounds that react with NaOH are:

a) X and Y only b) Y and Z only c) Y and L only d) Y, Z, and L only

117- Which of the following structural formulas represents a saturated aliphatic hydrocarbon?

a) $CH_3(CH_2)_2CHCH_2$ b) C_4H_6

c) $CH_3C(CH_3)_3$ d) $CH_2C(CH_3)_2$

118- (X) and (Y) are saturated hydrocarbon compounds.(3)moles of CO_2 are produced When one mole of either burned,.

- What is the number of methylene groups in each of (X) and (Y)?

(a) (1), (3) (b) (2), (3)

(c) (0), (1) (d) (2), (0)

119- Which of the following processes produces a compound that does not decolorize an acidified potassium permanganate solution?

a) Catalytic hydration of ethene b) Catalytic hydration of propene

c) Catalytic hydration of ethyne d) Catalytic hydration of propyne

120- Which of the following represents the IUPAC name of the compounds resulting from the ammonolysis decomposition of the compound shown in the figure?

a) 2-Propanol and formamide

b) 2-Propanol and methanamide

c) Isopropyl alcohol and acetamide

d) 1-Propanol and ethanamide

121- Compound (X) is produced by alkaline hydrolysis of one isomer of $C_5H_{11}Br$,that does not contain a methylene group, and removes the purple color of acidified potassium permanganate solution.

- Which of the following represents the IUPAC name of compound (X)?

a) 2,2-Dimethyl-1-propanol b) 2-methyl-2-butanol

(c) 2-methyl-3-butanol d) 3-methyl-2-butanol

122- (X and Y) Organic Compounds

X: Has the molecular formula C_5H_{10}

Y: Produced by the addition of HBr to compound (X) and is named according to IUPAC "2-bromo-2-methyl-butane"

- Which of the following represents the structural formula of compound (X)?

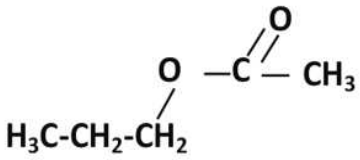
a) CH_3-CH=CH-CH_2-CH_3 b) $(CH_3)_2C$=CH-CH_3

c) CH_2=CH-$CH(CH_3)$-CH_3 d) CH_2=CH-$CH(CH_3)_2$

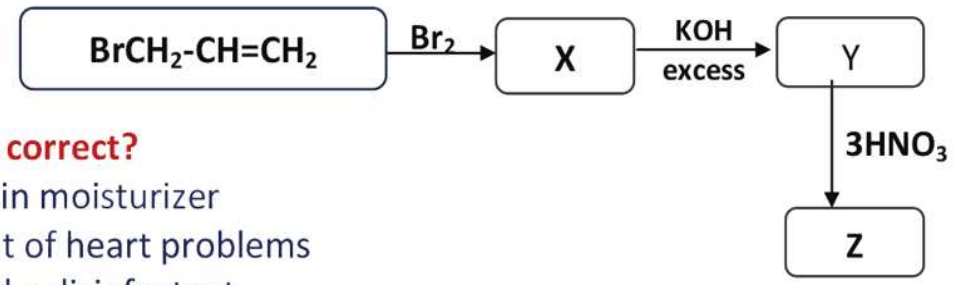
موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

123- Which of the following compounds reacts under suitable conditions to produce the corresponding compound?

(a) Propanoic acid and methanol
(b) Propanoic acid and ethanol
(c) Acetic acid and 1-propanol
(d) Acetic acid and 2-propanol



124- The following diagram shows some reactions of organic compounds:



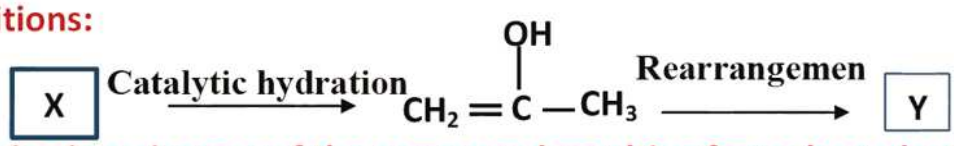
- Which of the following is correct?

(a) Y: An explosive and a skin moisturizer
(b) Z: Used in the treatment of heart problems
(c) Y: An alcoholic drink and a disinfectant
(d) Z: Used in hydraulic brakes.

125- Which of the following represents the correct order of the processes required to obtain the simplest tertiary alcohol?

(a) Dehydration of 2-butanol followed by catalytic hydration
(b) Dehydration of 2-methyl-1-propanol followed by catalytic hydration
(c) Addition of HBr to 2-methyl butene followed by alkaline hydrolysis
(d) Addition of HBr to 1-butene followed by alkaline hydrolysis

126- The following diagram represents the reactions of some organic compounds under suitable conditions:



- Which of the following is an isomer of the compound resulting from the reduction of Compound (Y)?

a) Propanal b) Ethyl methyl ether c) 2-propanol d) Propanone

127- The following reactions take place under suitable conditions to obtain compounds (A), (B), and (C) as follows:

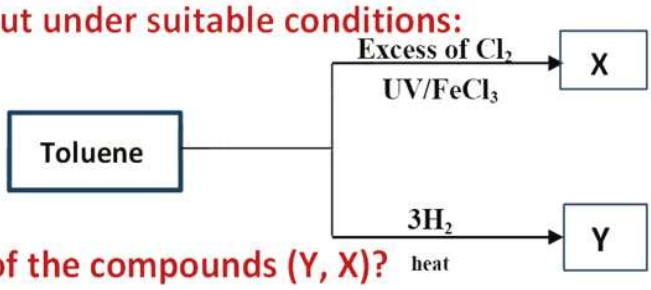
Given that (B) is an unsaturated, asymmetric hydrocarbon.

- Which of the following represents compounds (A), (B), and (C)?

(a) (A): propyl hydrogen sulphate , (B): propyne , (C): propane
(b) (A) ethyl hydrogenated sulphate , (B) Ethene , (C) Ethane
(C) (A) butyl Hydrogenated sulphate , (B) 2-butene , (C) butane
(d) (A) butyl Hydrogenated sulphate, (B) 1-butene , (C) butane

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

128- The following reactions were carried out under suitable conditions:



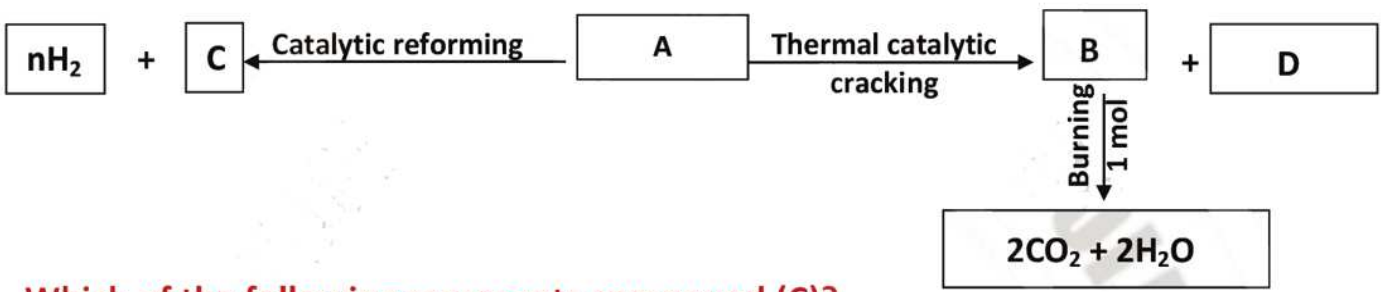
-Which of the following represents each of the compounds (Y, X)?

(a) X: meta-chloro toluene , Y: methyl benzene
(b) X: 3,5-dichlorotoluene , Y: methyl cyclohexane
(C) X: para-chloro toluene , Y: cyclohexane
(d) X: 2, 4, 6-Trichloro toluene , Y: Methyl cyclohexane

129- Which of the following represents the correct order of processes required to obtain a detergent from the simplest alkyne?

(a) Cyclic polymerization – Sulphonation – Alkylation – Neutralization
(b) Cyclic polymerization – Alkylation – Sulfonation – Neutralization
(c) Rapid heating and cooling – UV chlorination – Sulfonation
(d) Rapid heating and cooling – Sulfonation – UV chlorination

130- From the following diagram:



- Which of the following represents compound (C)?

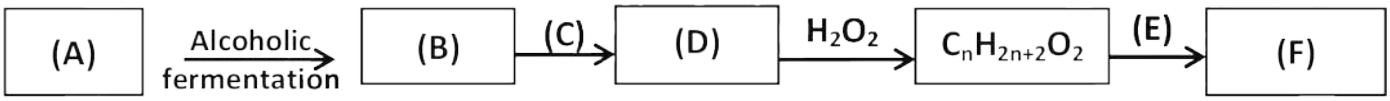
-If you know that compound (C) is used in the manufacture of explosives
-Which of the following represents the IUPAC name of compound (B) and the physical state of compound (D) under normal conditions?

(A) (B): Ethylene, (D): Liquid
(B) (B): Ethane, (D): Gaseous
(C) (B): Ethane, (D): Gaseous
(D) (B): Ethene, (D): Liquid

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

Essay questions:

1- Study the following diagram:



- If you know that (F) is a dibasic carboxylic acid

(a) Write the names of organic compounds (A) and (D)

(b) Name the compounds (C) and (E)

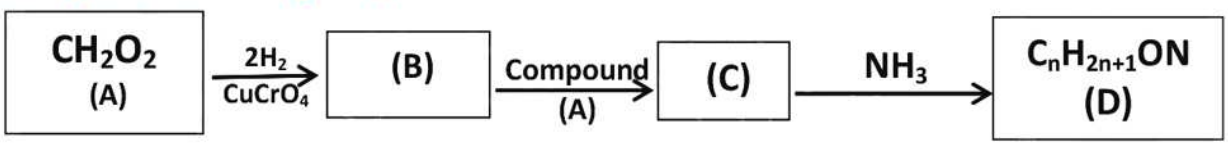
.....

.....

.....

.....

2- Study the following diagram:



Answer the following questions:

1- What is the common name for compound (A)?

2- Write the structural formula of the compound formed from the reaction of Compound (B) with $C_7H_6O_3$?

3- What is the IUPAC name for compound (C)?

4- Write the structural formula of compound (D).

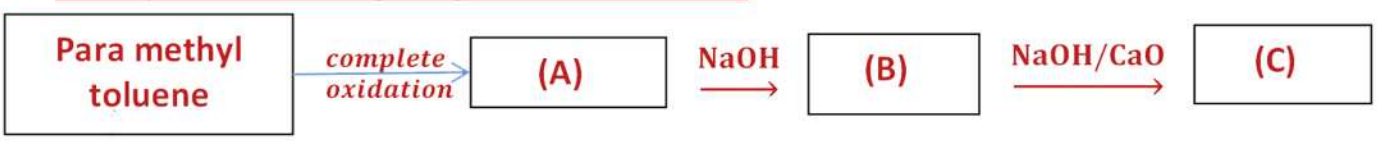
.....

.....

.....

.....

3- Study the following diagram and answer:



1-write the structural formula of the compounds (A, B, C)

2-Mention one use of the compound (A)

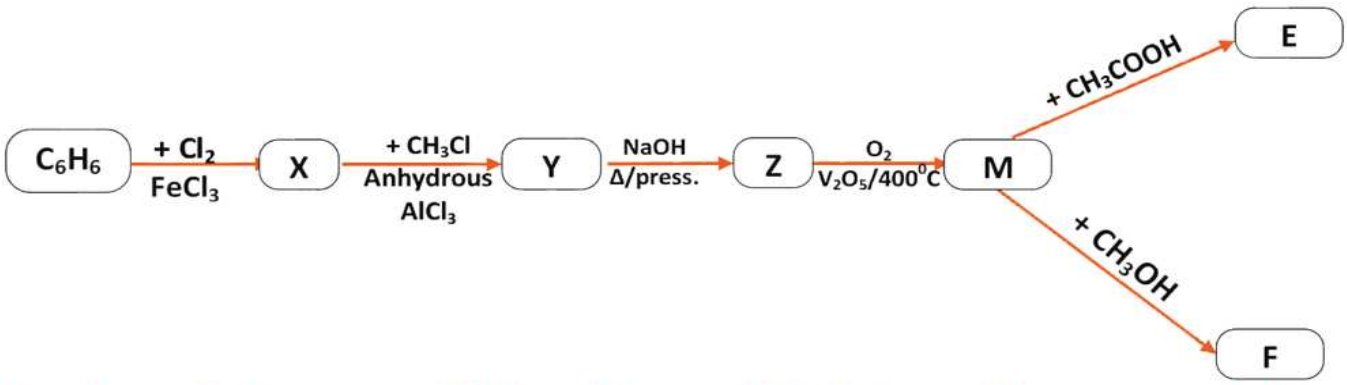
.....

.....

.....

D.M.RAZK موقع الدكتور محمد رزق معلم الكيمياء التعليمي

4- From the following diagram:



If you know that compound (E) is used as a medicinal drug and is recommended to be taken with plenty of water to prevent stomach ulcers:

- Write the chemical formulas of compounds (Z) and (Y).
- Write the chemical formula of the acid produced by the acidic hydrolysis of Compound (F).
- Mention one use of compound (F).

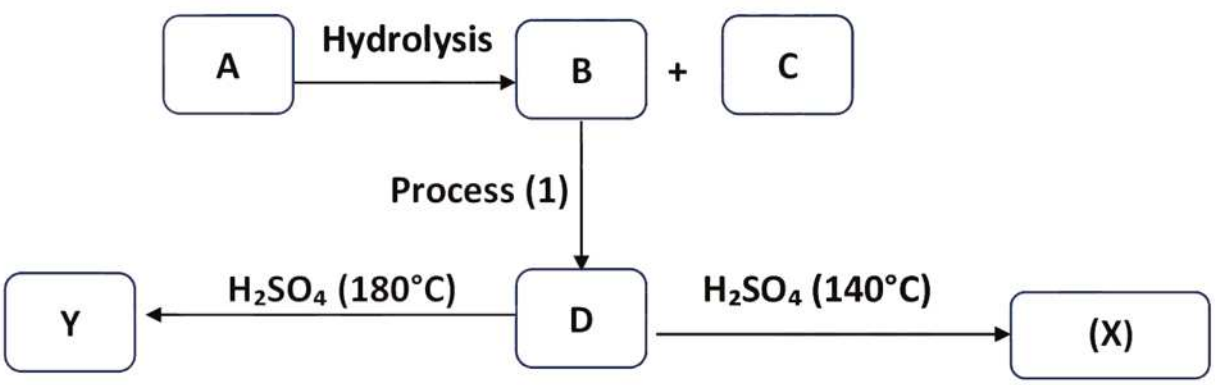
.....

.....

.....

.....

5- From the following diagram: -



-Knowing that (C, B) are isomers:

1- Write the chemical formulas for (X) and (C).
2- Name process number (1).
3- Write the IUPAC name of the compound that yields a sodium organic salt in One process
4- Write the structural formulas of the alcoholic isomer of compound (X) that Does not oxidize with normal oxidizing agents

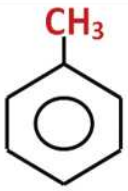
.....

.....

.....

D.M.RAZK
موقع الدكتور محمد رزق معلم الكيمياء التعليمي

6- The following table shows the chemical formulas of organic compounds:

(A)	(B) $CH_2=CH_2$	(C) $CH_3-CH=CH_2$
(D) $CH\equiv CH$	(E)	(F) 

Write the IUPAC name for each of the following:

a) The compound formed by reacting 1 mol of one of the above compounds with 2 mol of bromine to produce a saturated compound

b) The compound formed by reacting HBr with one of the above compounds according to Markownikoff's rule in the first step.

c) The two compounds formed by reacting 2 mol of one of the above compounds with 2 Mol of chlorine under suitable conditions to give two mono chloro isomers

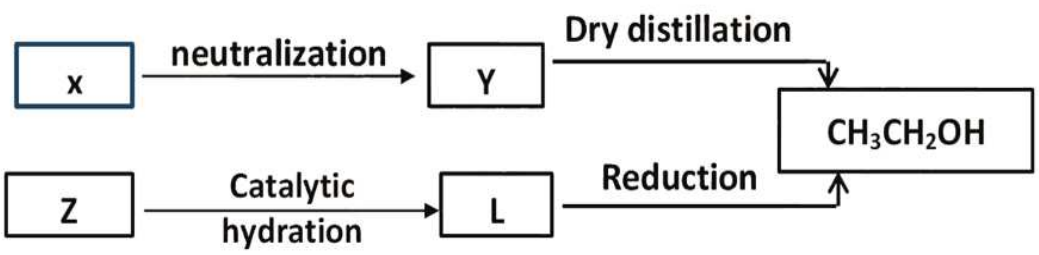
.....

.....

.....

.....

7- The following diagram represents some reactions in organic compounds:



1-State the IUPAC name of the isomer of the compound from adding formed Excess of HBr to compound (Z)

2- State the IUPAC name of the product from the reduction of compound (X)

3- Write the structural formulas for compounds (Y) and (L)

.....

.....

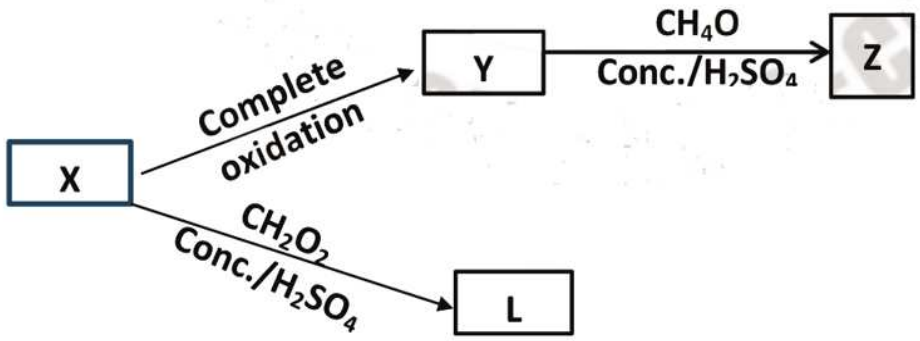
.....

.....

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

8- The following diagram shows some reactions of organic compounds:

- Compound (Y) is used in the manufacture of rayon and (Z, L) are isomers, write the chemical formula for each of (X, Y, Z, L).



موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

١-المركبات التي عند تسخينها تعطي (D): هي أكسالات الحديد (II) (تعطي FeO) أو كبريتات الحديد (II) (تعطي Fe_2O_3). بناءً على السلسلة، (C) هو FeO و (D) هو Fe_2O_3. لذا المركب هو كبريتات الحديد (II).

2- المركب الناتج من تفاعل (D) مع HCl المركز: هو كلوريد الحديد (FeCl) (III)

3.الصيغة الكيميائية للمركب (F): بما أن (D) هو Fe_2O_3 يتفاعل مع H_2SO_4 المركز ليعطي (F)، إذن (F) هو كبريتات الحديد (III) ذات الصيغة $Fe_2(SO_4)_3$

اجابة الوحدة الثانية

1-(a)
2-(a)
3-(b)
4-(a)
5-(a)
6-(c)
7-(a)
8-(a)
9-(d)
10-(d)
11-(a)
12-(a)
13-(d)
14-(c)
15-(c)
16-(c)
17-(d)
18-(a)
19-(d)
20-(d)
21-(b)
22-(c)
23-(b)
24-(a)
25-(b)
26-(d)
27-(a)
28-(B)
29-(d)
30-(d)
31-(d)
32-(d)
33-a
34-c
35-b

اجابة الوحدة الاولي

1-(b)
2-(c)
3-(c)
4-(b)
5-(b)
6-(d)
7-(b)
8-(d)
9-(d)
10-(a)
11-(d)
12-(d)
13-(b)
14-(d)
15-(C)
16-(d)
17-(b)
18-(a)
19-(d)
20-(d)
21-(d)
22-(c)
23-(c)
24-(d)
25-(b)
26-(b)
27-d
28-(c)
29-(c)
30-(b)
31-(a)
32-(d)
33-(b)
34-(b)
35-(d)
36-(b)
37-(d)
38-(a)
39-(d)
40-(c)
41-(b)
42-(c)
43-(c)
44-(c)
45-(c)
46-(b)
47-(b)
48-(d)
49-(a)
50-(D)
51-(a)
52-(c)
53-(c)
54-(b)
55-(c)
56-(a)
57-(a)
58-(b)
59-(b)

اجابات الاسئلة المقالية

1-

تفاعلات الحديد ومركباته:

(a) العملية (1) هي انحلال حراري (تسخين كبريتات الحديد II)، والعملية (2) هي اختزال (أكسيد الحديد III

b. (المركب (C) هو $4FeSO$ والمركب (D) هو Fe_2O_4

2-

١- (M): الحديد، (X): أكسيد حديد (II)، (Y): كبريتات حديد II.

٢- المركب $FeSO_4$ (أعلى عزم مغناطيسي، 4 إلكترونات مفردة).

3-

الصيغ الكيميائية:

(F): كبريتات الحديد(II) ($FeSO_4$).

(B):هيدروكسيدالحديد(III) $Fe(OH)_3$.

٢-رقم العملية: العملية رقم (٢) (تسخين هيدروكسيد الحديد III لأعلى من 200°C للحصول على أكسيد الحديد III)، لا يتغير فيها عدد إلكترونات d المفردة.

٣- اسم العملية (٣): التحلل الحراري لكبريتات الحديد (II).

4-

1-(a) الصيغة الكيميائية لملح (ZCl_2) هو كبريتيد الفضة أو مشابهه (بناءً على الرسم، الملح يعطي راسباً أسود مع HCl، لذا هو Ag_2S).

(b) الراسب الأسود (W) هو كبريتيد الفضة Ag_2S.

2-.أملاح النترات التي تعطي ملاحظات مشابهة: نترات الفضة ($AgNO_3$) (مع كلوريد) و نترات الرصاص $pbNO_3)_2$ (مع كبريتيد).

5-

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

7-(c)
8-(d) (C)
9-(a)
10-(b)
11-(c)
12-(c)
13-(c)
14-(c)
15-(b)
16-(a)
17-(d)
18-(A)
19-(a)
20-(b)
21-(d)
22-(b)
23-(c)
24-(b)
25-(c)
26-(b)
27-(d)
28-(d)
29-(a)
30-c
31-c
32-c
33-b
34-d
35-b
36-(d)
37-(c)
38-(a)
39-(c)
40-(a)
41-(c)
42-(b)
43-(b)
44-(b)
45-(b)
46-(b)
47-(c)
48-(a)
49-(a)
50-(a)
51-(d)
52-(d)
53-(d)
54-(c)
55-(c)
56-(d)

35-(a)
36-(c)
37-(d)
38-(c)
39-(d)
40-(c)
41-(c)
42-(d)
43-(a)
44-(a)
45-(c)
46-(b)
47-(d)
48-(d)
49-(a)
50-(c)
51-(d)
52-(c)
53-(b)
54-(d)
55-(c)
56-(d)
57-(d)
58-(d)
59-(c)
60-(a)
61-(a)
62-(d)
63-(c)

اجابات الاسئلة المقالية

1-
محلول حمض الهيدروفلوريك:
1- أعلى pH: المحلول (C) (لأنه الأقل تركيزاً).
2-أعلى تركيز أيونات فلوريد: المحلول (A) (لأنه الأكثر تركيزاً)
3- قيمة Ka: ثابت التأين لا يتغير بتغير التركيز (يبقى 6.7 ×10^{-4})
4-نسبة التفكك 4.9%: المحلول (C).

اجابة الوحدة الرابعة

1-(b)
2-(c)
3-(c)
4-(d)
5-(b)
6-(c)

في أنبوب A).
4-هو ملح KCl (الموجود في أنبوب D).
-2
(X) alt $FESOS_4$(كبريتات الحديد II) أو $FESCl_4$
(Y)-2 alt Na_2SOS_4
Precipitate (A)-3
كبريتيد النحاس II (أسود).
Precipitate (B)-4 هيدروكسيد الحديد II (أبيض مخضر).

اجابة الوحدة الثالثة

1-(c)
2- (b)
3-(b)
4-(b)
5-(b)
6-(c)
7-(c)
8-(d)
9-(c)
10-(c)
11-(c)
12-(d)
13-(c)
14-(b)
15-(b)
16-(c)
17-(a)
18-(b)
19-(d)
20-(b)
21-(b)
22-(c)
23-(b)
24-(b)
25-(c)
26-(c)
27-(b)
28-(d)
29-c
30-d
31-a
32-a
33-d
34-a

36-a
37-b
38-(d)
39-(a)
40-(b)
41-(a)
42-(d)
43-(c)
44-(a)
45-(d)
46-(c)
47-(c)
48-(d)
49-(a)
50-(d)
51-(d)
52-(a)
53-(b)
54-(d)
55-(d)
56-(b)
57-(a)
58-(a)
59-(b)
60-(c)
61-(d)
62-(a)
63-(a)
64-(c)
65-(a)
66-(c)
67-(a)
68-(c)
69-(a)
70-(c)

اجابات الاسئلة المقالية

1-
١- مع $Ca(HCO_3)_2$ يتصاعد غاز CO_2 الذي يعكر ماء الجير.
مع $Al(NO_3)_3$ لا يحدث تفاعل ملحوظ (لأنه ملح حمض قوي).
مع $feSO_4$ لا يحدث تفاعل ملحوظ.
مع KCl لا يحدث تفاعل ملحوظ.
2-هو محلول $Al(NO_3)_3$ (الموجود في أنبوب B).
3-هو محلول $HCO_3)_2$ (الموجود

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

101-(a)
102-(a)
103-(c)
104-(a)
105-(a)
106-(c)
107-(d)
108-(b)
109-(b)
110-(b)
111-(c)
112-(d)
113-(c)
114-(b)
115-(d)
116-(a)
117-(b)
118-(c)
119-(c)
120-(b)
121-(c)
122-(b)
123-(a)
124-(a)
125-(b)
126-(b)
127-(a)
128-(a)
129-(c)
130-(c)
131-(d)
132-(b)
133-(b)
134-(A)

اجابات الاسئلة المقالية

1-

(a) المركب (A) هو الجلوكوز $C_6H_5OH_6$
والمركب (D) هو الإيثيلين C_2H_4
b. المركب (C) هو الإيثانول C_2H_5OH
والمركب (E) هو حمض الأكساليك (أو حمض كربوكسيلي ثنائي القاعدة).

2-

مخطط المركبات العضوية: 1-الاسم الشائع للمركب (A): حمض الفورميك.
2- الصيغة البنائية للناتج: إستر

51-(b)
52-(d)
53-(c)
54-(c)
55-(d)
56-(d)
57-(c)
58-(b)
59-(b)
60-(a)
61-:(a)
62-c
63-a
64-(d)
65-(d)
66-(b)
67-(d)
68-(d)
69-(d)
70-(d)
71-(c)
72-(b)
73-(c)
74-(a)
75-(a)
76-(c)
77-(a)
78-(c)
79-(d)
80-(c)
81-(a)
82-(b)
83-(d)
84-(a)
85-(d)
86-(b)
87-(c)
88-(c)
89-(a)
90-(c)
91-(c)
92-(d)
93-(c)
94-(a)
95-(c)
96-(b)
97-(a)
98-(d)
99-(d)
100-(c)

1-(a)
2-(c)
3-(b)
4-(b)
5-(b)
6-(b)
7-(d)
8-(c)
9-(a)
10-(b)
11-(c)
12-(d)
13-(b)
14-(c)
15-(b)
16-(d)
17-(b)
18-(a)
19-(c)
20-(a)
21-(c)
22-(c)
23-(d)
24-(b)
25-(d)
26-(d)
27-(d)
28-(c)
29-(d)
30-(b)
31-(a)
32-(b)
33-(d)
34-(c)
35-(c)
36-(c)
37-(b)
38-(a)
39-(b)
40-(c)
41-(d)
42-(d)
43-(a)
44-(c)
45-(b) (A)
46-(d)
47-(a)
48-(c)
49-(c)
50-(d)

57-(b)
58-(c)
59-(a)
60-(b)
61-(c)
62-(c)
63-(a)
64-(a)
65-(c)
66-(c)
67-(d)
68-(c)
69-(c)
70-(d)
71-(c)

اجابات الاسئلة المقالية

1-

a) Identify the anode) and cathode in a lithium battery:
الأنود (قطب التأكسد): الجرافيت الليثيوم (C_6liC).
الكاثود (قطب الاختزال): أكسيد ليثيوم كوبلت ($liCoO_{25}$).

b) Identify (lead battery) or lithium cell) where spontaneous reactions occur: كلاهما يحدث فيهما تفاعلات تلقائية (كلاهما خلايا جلفانية).

2-

(A) تحليل المخطط: هو أسيتات الإيثيل
(F) هو (حافظ للفواكه)، الأسيتالدهيد (ناتج هيدراتة البروباين لا يطابق، إذاً F هو الأسيتالدهيد الناتج من هيدراتة الإيثاين).

(1) Structural formulas:
(B): أسيتات الصوديوم CH_3COONa
(D): الإيثانول (CH_3CH_2OH)
(2) Chemical processes:
(C): الاختزال (Reduction) لتحويل الأسيتالدهيد إلى كحول.
(E): الأكسدة (Oxidation) لتحويل الكحول إلى ألديهيد.

اجابة الوحدة الخامسة

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

ماركوفنيكوف على البروبين
(C) مع HBr يعطي 2-برومو
بروبان.
c) تفاعل 2 مول من البنزين
(E) أو التولوين (F) مع الكلور
يعطي أورثو-كلوروتولوين
وبارا-كلوروتولوين (من
التولوين F).
7-
1,1- IUPAC name: ثنائي
برومو إيثان.
2- (Reduction of (X:
الإيثانول.
3- (Y
Structural formulas:
(L) (حمض الإيثانويك،
الإيثانول.
(X)- ٤٦ هو الإيثانول
(C_2H_5OH).
الأكسدة التامة تعطي
(Y) وهو حمض الأسيتيك
(يستخدم في صناعة الحرير
الصناعي/الريون).
تفاعل الإيثانول مع H_2SO_4 عند
180 درجة يعطي الإيثيلين،
وعند 140 درجة يعطي إيثر
ثنائي الإيثيل. بما أن (Z) و (L)
أيزومرات، فإن أحدهما إيثر
ثنائي الإيثيل والآخر بيوتانول
(أو حسب سياق المنهج: Z هو
إيثر و L هو كحول أولي).

ساليسيلات الميثيل (زيت
المروخ).
3- الاسم IUPAC للمركب
(C): ميثانول.
4-الصيغة البنائية لـ (D): ميثيل
أمين
CH_3NH_2
3-
1- (A) حمض تيريفثاليك، (B)
تيريفثالات الصوديوم، (C)
البنزين.
2- صناعة ألياف الداكرون.
4-
المركب (E) هو الأسبرين
(حمض أسيتيل ساليسيليك)،
والمركب (F) هو إستر (مثل
ساليسيلات الميثيل). الحمض
الناتج من التحلل المائي لـ
(F) هو حمض الساليسيليك
($C_7H_6O_3$)
المركب (F) هو ساليسيلات
الميثيل، ويستخدم كـ مادة
مطهرة أو تدخل في صناعة
المراهم المسكنة للآلام
الروماتيزمية.
5-
١- (X): إيثر ثنائي الإيثيل
$C_2H_5-O-C_2H_5$
(C): حمض الأسيتيك.
(CH_3COOH).
(٢): نزع الماء من الإيثانول.
٣-الاسم (IUPAC): حمض
الأسيتيك (حمض الإيثانويك)
هو الذي يعطي ملح عضوي
(أسيتات الصوديوم) عند تفاعله
مع هيدروكسيد الصوديوم.
٤-الصيغة البنائية للأيزومر
الكحولي: الكحول الذي لا
يتأكسد هو كحول ثالثي،
والأيزومر هو 2-ميثيل-2-
بروبانول (كحول بيوتيلي ثالثي)،
وصيغته البنائية:
$CH_3-C(OH)(CH_3)-CH_3$
6-
a) المركب هو
1,2,3,4-تترابرومو هكسان
(ناتج عن إضافة 2 مول بروم
لمركب (A) حلقي غير مشبع).
b) تطبيق قاعدة

موقع الدكتور محمد رزق معلم الكيمياء التعليمي D.M.RAZK

موقع الدكتور محمد رزق التعليمي

امسح الباركود بالموبيل لتثبيت التطبيق وتحميل كل الملازم مجانا وبسرعه

MR

حمل التطبيق الأن

GET IT ON Google Play

ملازم ابتدائي | ملازم اعدادي | ملازم ثانـــوي | كورسات ونتائج امتحانات

موقع الدكتور محمد رزق
Dr.MoRizK